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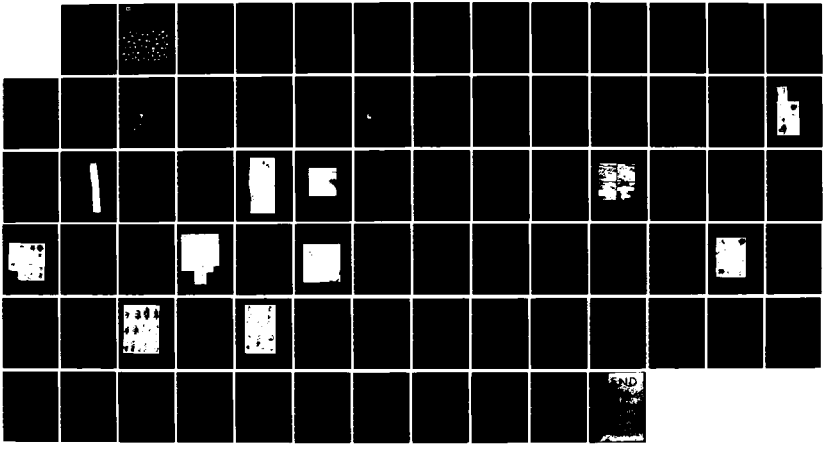

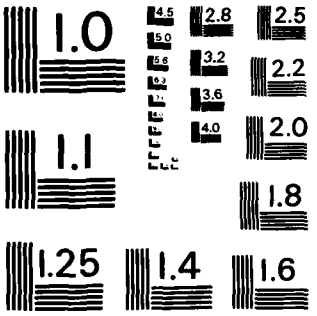

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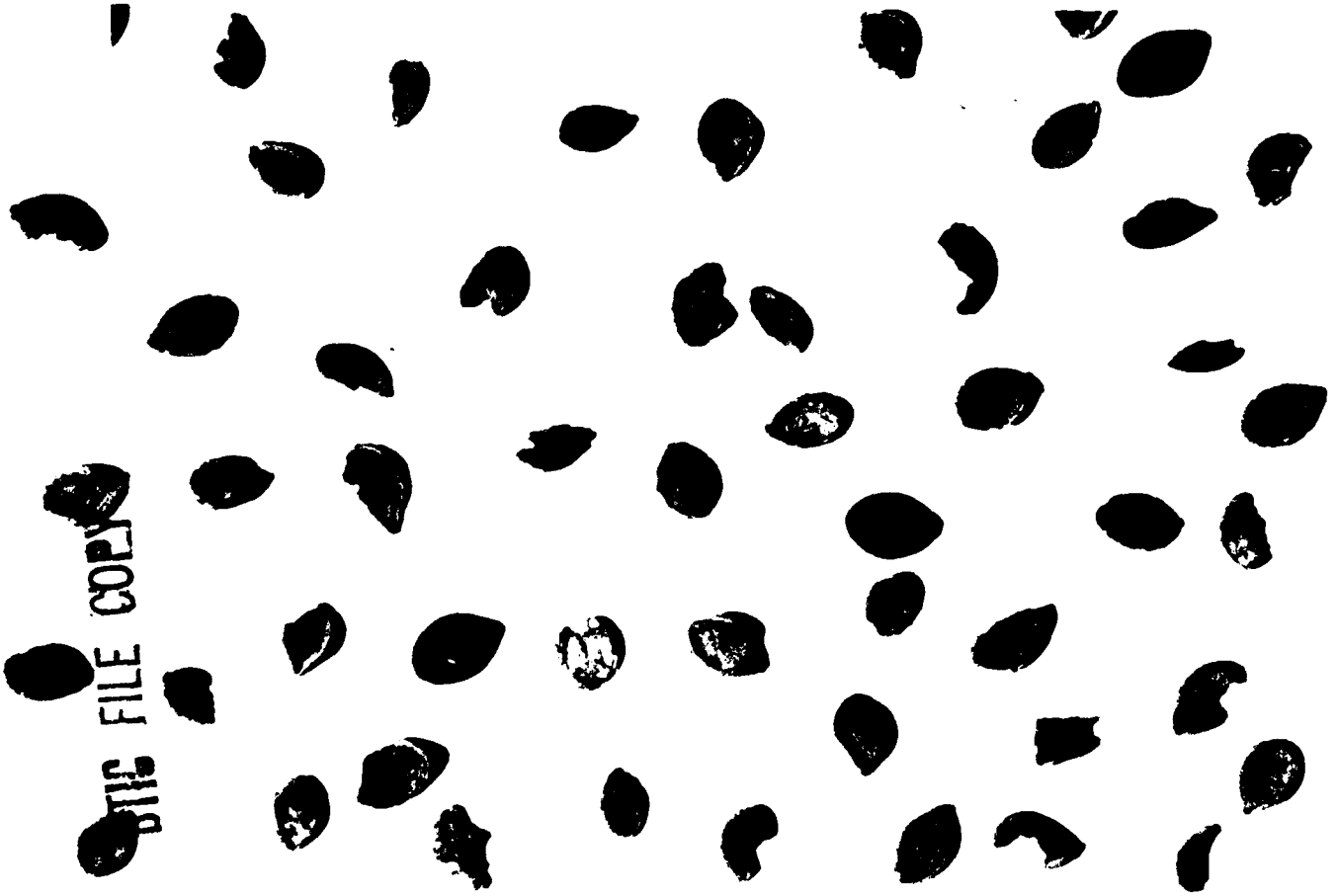
Phillips Spring, Missouri: Report of the 1978 Investigations



By Marvin Kay

June 1982

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

The 1978 excavation of Phillips Spring in the lower Pomme de Terre River Valley added information that may allow for a refined model of cultural and environmental interaction on the western flank of the Missouri Ozarks. Phillips Spring is a cornerstone in the knowledge of an early horticultural complex that preceded domestication of plants native in the East.

Investigations prior to 1978 established that Phillips Spring: had tropical cultigens (cucurbits) which predate 4000 radiocarbon years; had excellent preservation of wild and domesticated plant remains; had stratigraphically

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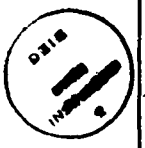
defined living floor and storage pit features for much of the Late Archaic and Woodland periods and was the only known Pomme de Terre valley site having a partial Holocene pollen record, primarily of the early or middle Holocene.

The 1978 investigations were designed to supplement information gained in previous excavation. The systematic recovery of ethnobotanical remains and radiocarbon samples from well-defined stratigrahic contexts was a prime objective.

PHILLIPS SPRING, MISSOURI: REPORT OF THE 1978 INVESTIGATIONS

by

Marvin Kay



A PROJECT CONDUCTED FOR THE
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by

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Springfield 62706

September 1982

ABSTRACT

Phillips Spring, 23HI216, is one of a few eastern North America archaeological sites where tropical cultigens (cucurbits) predate 4000 radiocarbon years B.P. Thus, it is a cornerstone in the knowledge of an early horticultural complex that preceded domestication of plants native in the East. Excavation of this site in the western Ozark Highland has been conducted over four field seasons following its discovery in 1973: in 1974, 1976 - 1978. In 1979, Phillips Spring was inundated by Harry S. Truman Reservoir, Missouri; the site is being nominated by the Corps of Engineers, Kansas City District to the National Register of Historic Places as part of a multiple resource district for Truman Reservoir. The report describes the results of the 1978 field investigations, incorporates relevant information from previous efforts, and makes recommendations for analysis of site collections.

The 1978 excavation was within a 228 m^2 block that, in part, overlapped a comparable area excavated in 1977. Terrace 1b and spring sediments were also sectioned with mechanical equipment to bedrock, exposing continuous profiles of over 5 m which were sampled for pollen, datable wood or charcoal, sediment, vertebrate and invertebrate remains. Archaeological components for the Late Archaic and Woodland periods were physically defined in stratigraphic units K and E by a succession of discrete living floors and other architectural features separated by sterile layers of alluvium. The basal archaeological component, the Squash and Gourd Zone (unit K^2), has an average age of 4257 ± 39 years B.P. and is succeeded by five other Late Archaic components in unit E. All have diagnostic Sedalia phase artifacts. A Middle Woodland component(s) in unit E, defined near the spring conduit in 1977, was excavated as well.

Regional developments during the Middle Woodland period probably centered in the major Midwest river valleys of the Missouri and Illinois, where sedentary villages are a hallmark of large population aggregates, not at Phillips Spring or other sites in the lower Pomme de Terre River valley. In contrast, we can argue that Phillips Spring was in the forefront of changes in Late Archaic subsistence economy that three millennia later led to the pre-eminence of agriculture in the East.

PREFACE

The 1978 excavation of Phillips Spring marked a watershed in research in the lower Pomme de Terre River valley. These efforts added information on community layout, subsistence and paleoenvironmental change that may allow for a refined model of cultural and environmental interaction on the western flank of the Missouri Ozarks.

The success of the project is due to an exceptionally dedicated staff of field workers, scientists from other disciplines and many nearby landowners who have helped in innumerable ways over the entire course of Phillips Spring field work. Especial thanks are due to Christine K. Robinson who, as senior site assistant, provided cheerful continuity to the daily operation and also directed the entire operation when I was absent. Richard Hake supervised the field recovery system, an often thankless but absolutely essential job. Within the excavation I was ably served by Bruce Benz, field assistant, John Nylander and Tom Koenig, who both acted as photographers. Nylander in particular deserves credit for designing the photomodule used in the excavation. The good humor and, above all, common sense of Paul Stevens and Peter Brown made the summer all the more memorable.

The help and insights of my colleagues C. Vance Haynes, James E. and Frances B. King, James R. Purdue and R. Bruce McMillan are also greatly appreciated.

Mechanical assistance was ably provided by Edsel Breshears and Homer Routh of Wheatland, Missouri. They both risked backhoes to insure completion of deep stratigraphic tests and my safety; to both I owe a real debt.

I should note as well the help of William H. Henderson, Billy Watkins and the Southwest Electric Cooperative; and the administrative assistance of **the Kansas City District, Corps of Engineers.**

Amy Trester helped with the graphics in this report.

The research summarized herein was supported entirely by a series of contract amendments to the Corps of Engineers (KCD) contract for mitigation of the adverse impact of Truman Reservoir on Rodgers Shelter, with the exception of the 1974 field work done under contract with the National Park Service.

All materials and records from Phillips Spring are on file with the Quaternary Studies Center, Illinois State Museum, Springfield.

Text citations of C^{14} dates are with respect to the 5568 year half life.

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INTRODUCTION

Phillips Spring, 23HI216, an archaeological site in the Ozark Highland of western Missouri, has been the subject of a multiyear program of interdisciplinary research designed to mitigate the adverse impact of Harry S. Truman Reservoir on this site. Interest in Phillips Spring was stimulated by research at Rodgers Shelter, a second lower Pomme de Terre valley site with a nearly complete Holocene chronicle but lacking essential pollen records for this period. Once pollen and deeply buried archaeological components were identified in 1973, Phillips Spring assumed major importance as a correlated site. Excavations by the Illinois State Museum, begun under the sponsorship of the National Park Service in 1974 (Chomko 1976), were continued by the Corps of Engineers in 1976, 1977 (in Kay 1978) and 1978. In 1979, Phillips Spring was inundated by Truman Reservoir. The site is being nominated to the National Register of Historic Places as part of the Harry S. Truman Reservoir multiple resource district.

Investigations prior to 1978 established that Phillips Spring: (i) is one of a few sites in eastern North America that has tropical cultigens (cucurbits) which predate 4000 radiocarbon years ago (B.P.); (ii) has excellent preservation of wild and domesticated plant remains which either grew near the spring or were collected or grown for food; (iii) has stratigraphically defined living floor and storage pit features for much of the Late Archaic and Woodland periods, many of which are dated by radiocarbon and demonstrate valley inhabitation during the cultural hiatus at Rodgers Shelter (McMillan 1976b:225); and (iv) is the only known Pomme de Terre valley site having even a partial Holocene pollen record, primarily of the early or middle Holocene that may contribute to the understanding of major changes in Holocene environments and climates.

The 1978 investigations were designed to supplement information gained in previous excavation. The large scale excavation of contiguous blocks, started in 1977, was expanded in efforts to further delineate archaeological features and their complex stratigraphy. The systematic recovery of ethnobotanical remains, of pollen and radiocarbon samples from well-defined stratigraphic contexts was, again, a prime objective.

This report is essentially a descriptive summary of the 1978 excavations and includes pertinent information from the preceding investigations. Neither Government intentions nor financial support allow more than a cursory treatment of material remains that include the largest and best controlled samples of ethnobotanical specimens and other categories of debris. Attention is specifically directed to excavation and recovery methods, radiocarbon dating, stratigraphy, excavation results, stylistic indices based on previous work here and at Rodgers Shelter, and to recommendations for analyses of out-of-ground collections. Appended also are other pertinent information about project administration or design, and draft report review correspondence. Also included as an appendix is a complete list of reports and publications about Phillips Spring; the following brief synopsis of the site setting and environment draws upon these references primarily.

ENVIRONMENTAL SETTING AND LOCALE

The lower Pomme de Terre valley, an affluent of the Osage, shares many physiographic, phytogeographic and edaphic features with sister drainages of the western flank of the Missouri Ozarks; as well as the seasonal rhythm of southern Prairie Peninsula climate that is often punctuated by extended drought. It lies within an environmental transition zone, or ecotone, where tall grass prairie interdigitates with the oak-hickory forest of the Ozark Highland. With the impact of changing climates, cessation of uncontrolled burning or other land use practices brought about by a modern farming economy, this unstable border has shifted east and west in modern and prehistoric times. Monitoring these environmental changes has been a prime objective of our research as they have had a direct bearing on settlement and subsistence in the Ozark Highland.

Phillips Spring is on the intermediate Terrace 1b, or Rodgers Terrace, on the right bank of the Pomme de Terre River in Hickory County just south of the Benton County line. Legal description is E½ SE¼ NE¼, Section 10, T38N, R22W. The terrace is approximately 3 m above the river and, at the site, is dissected by a discharge channel of the spring. The terrace elevation of 210 m (690 feet) above mean sea level places the site well within the conservation pool of Truman Reservoir.

The stretch of river near Phillips flowed north on a chert gravel bed. Shoals and chest-deep pools were common. South of the spring was a ford, which linked the dusty, rock strewn roads on either sides of the Pomme de Terre. The ford was typical of the shoal and eddy environments of the river itself, with clear fast flowing water over a gravel bed littered with live molluscs and small fish darting in and out of the rocks; small stands of willow and other water grasses carpeted the slower water courses of the ford. An occasional deep pocket of cool crystal clear water signaled the presence of an artesian spring in the riffles. The banks near the ford are lined with a remnant bottomland forest, sycamores are especially conspicuous. Just below Phillips, north of the ford, was a long cloudy pool with a silty bottom. The spring itself is essentially in the valley center about 80 m east of the river. It is another 80 m or so to the valley wall.

The valley walls are abrupt, steep or, as at Buzzard's Bluff, precipitous. The Jefferson City (Ordovician) formation outcrops in horizontal steps of dolomite with chert or tabular sandstone ledges for about 100 m above the valley floor, and is capped by thinner units of the Chouteau and Burlington formations. These superior formations each have distinctive fossiliferous cherts and limestones. Near the base of the Jefferson City, the Quarry Ledge member, a resistant dolomite with ubiquitous solution cavities, appears as a flying buttress jutting above undercut, softer Jefferson City dolomite. In the past these protected overhangs were convenient places of Indian encampment. As recently as the mid-1960's, several rockshelters saw service as "Ozark barns" for storage of farm machinery or bales of hay.

Ridge-and-valley topography, rarely interrupted by tablelands, typifies the uplands.

Phillips is at the southern end of what is locally known as the Breshears Bottom or Valley, after the original settlers and their descendants who still live on surrounding farms or nearby communities. There is a continuity in family, in experience and lifestyle that extends for about 150 years; a pride with the identity of this area, detailed knowledge of its landscape and potential. It is no accident that our best information on the location of artesian springs and other important sites, Phillips among them, came from members of Breshears, Tipton, Henderson, Martin or Trolinger families who lived here. Nor is it surprising that the Breshears Valley has been duly recorded and later restudied in the two classic works on "Plainville" by West (1945) and Gallaher (1961).

As a prehistorian, my interest in the Breshears Valley is easily explained by the diverse and complex Quaternary records contained in its sites. Figure 1 locates investigated sites. Many of the artesian springs contain both Pleistocene and Holocene data of one kind or another. Koch Spring, just upstream from Phillips, was probably the first to be excavated, in 1840, by Albert C. Koch who claimed to have discovered evidence of man and fossil mammals associated in the spring deposit (see McMillan 1976a for a review). Rodgers Shelter, the catalyst for most of the recent work in the valley, is approximately 4.2 km downstream from Phillips Spring.

METHODOLOGY

Excavation of wet or frozen sites presents unusual obstacles and opportunities. And requires a methodology that recognizes both.

Phillips Spring is but one example. Fortunately, we were able to apply techniques tested in other artesian spring excavations in the lower Pomme de Terre valley as well as the dry but deep excavation of Rodgers Shelter. This, together with our previous experience at Phillips Spring, clearly showed what the research potential and problems would be. The main advantage the site afforded was the detailed stratigraphy and exceptional preservation of material remains including plants. The difficulty in excavation of this deeply stratified site was compounded by having to constantly dewater.

The focus of the excavation was much as it had been the previous season in 1977. That is, we were still attempting: (i) to define living floors in a stratified context, (ii) to sample likely spots for pollen, and (iii) to assess the anatomy of the spring and the enveloping Rodgers Terrace. While these goals have been constant, the program of investigation and recovery has had to contend with daily dewatering and drainage of the excavation. Uncertainty was greatly reduced with installation of an electric power line. This virtually assured uninterrupted electricity for pumps, air compressors or other devices such as flood lights. But random happenstance, as with the six-inch plus rain of July 11, often became the decisive factor that forced radical alteration of research priorities. In this sort of excavation a course of action has to be flexible enough to recognize when a change in strategy is needed. Influencing our choice of strategy also was that this would

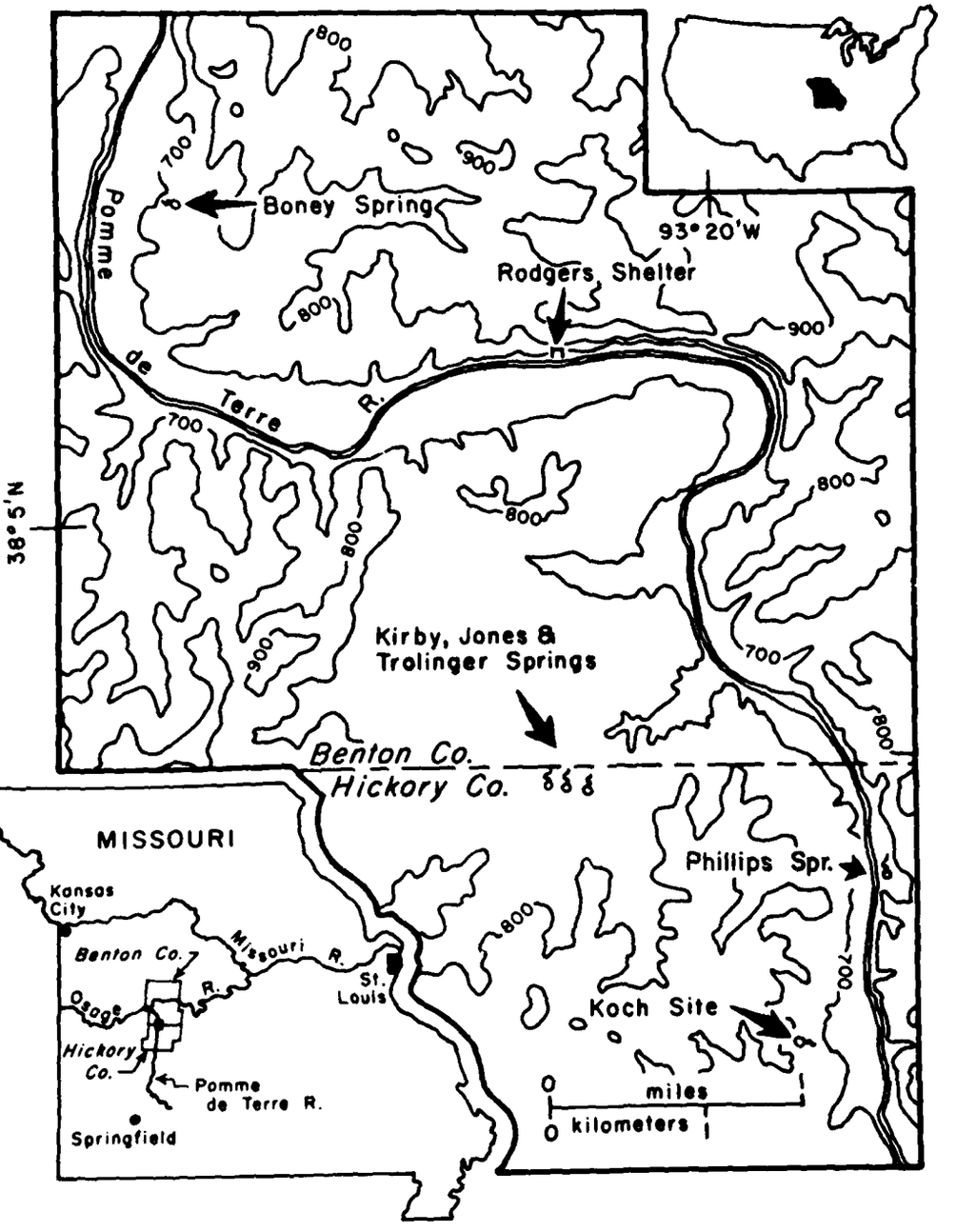

Figure 1. Investigated sites, Breshears Valley.

be the last chance, the final attempt to beat the rising waters of Truman Reservoir in the contest over valuable information. A last consideration in our strategy was to coordinate this effort with future inundation studies planned by the National Park Service.

Phillips Spring archaeology employed a standard repetoire of operating procedures for specific problem areas, as outlined above. Our philosophy is that scraps of evidence from poorly understood, ill defined contexts are more misinformation than they are data that can be reliably applied to research endeavors. Our bias at Phillips Spring and elsewhere is to assure contextual control from excavation units of defined volume rather than the haphazard collection of large samples.

The Phillips Spring operation is divisible into two integral halves, excavation and processing. In either case the techniques are specifically geared to this site but they could be modified for use at other locations.

The excavation was within a large block, initially established in 1977 and expanded in 1978 (Figure 2). The maximum area of the 1978 excavation was 228 m^2. Recovery units were generally formal 4 m or 2 m grid squares identified by Cartesian coordinates at the intersection of south and east grid lines. Horizontal control within these units was maintained with either a plane table and alidade or by triangulation from specified grid points, or both. The vertical datum, established in 1976 as an arbitrary plane above the ground surface, was again maintained with a transit and metric stadia; line levels keyed to this datum were used in instances where measurements could not be taken directly with the transit, or in conjunction with the transit when recording profiles.

Excavation was mainly within specific 10 cm arbitrary levels or natural units of less than 10 cm thickness. Skimming shovels, pick mattocks, trowels or other small hand tools were employed in removing fill from grid squares and features; at the end of a level, the floor was freshly troweled and diagramed, notes were recorded on a standard level summary form. *In situ* items were recorded individually as encountered, with proveniences and descriptions included on both excavation level forms and the site catalog. Duplicate information was also recorded on tags, bags or other containers for these items or other matrix samples excavated. Matrix samples of known provenience were taken for flotation from these excavations; other sediment samples were retained for future mechanical and chemical analyses. Munsell Soil Color Charts were used to standardize description of sediment color, usually recorded when wet but always under natural light.

Delineated living surfaces or floors and associated features were further subdivided into contiguous 50 cm grid squares for final recording and excavation, using procedures outlined above. Bulk charcoal samples as well as all matrix were saved for flotation from these smaller units, save small sediment samples. Vertical profiles of these surfaces or features were recorded as appropriate.

These procedures are identical to those used in 1977.

Photographic recording of the excavation with a standard reference photomodule was improved over that of 1977 by the addition of a 4" X 5"

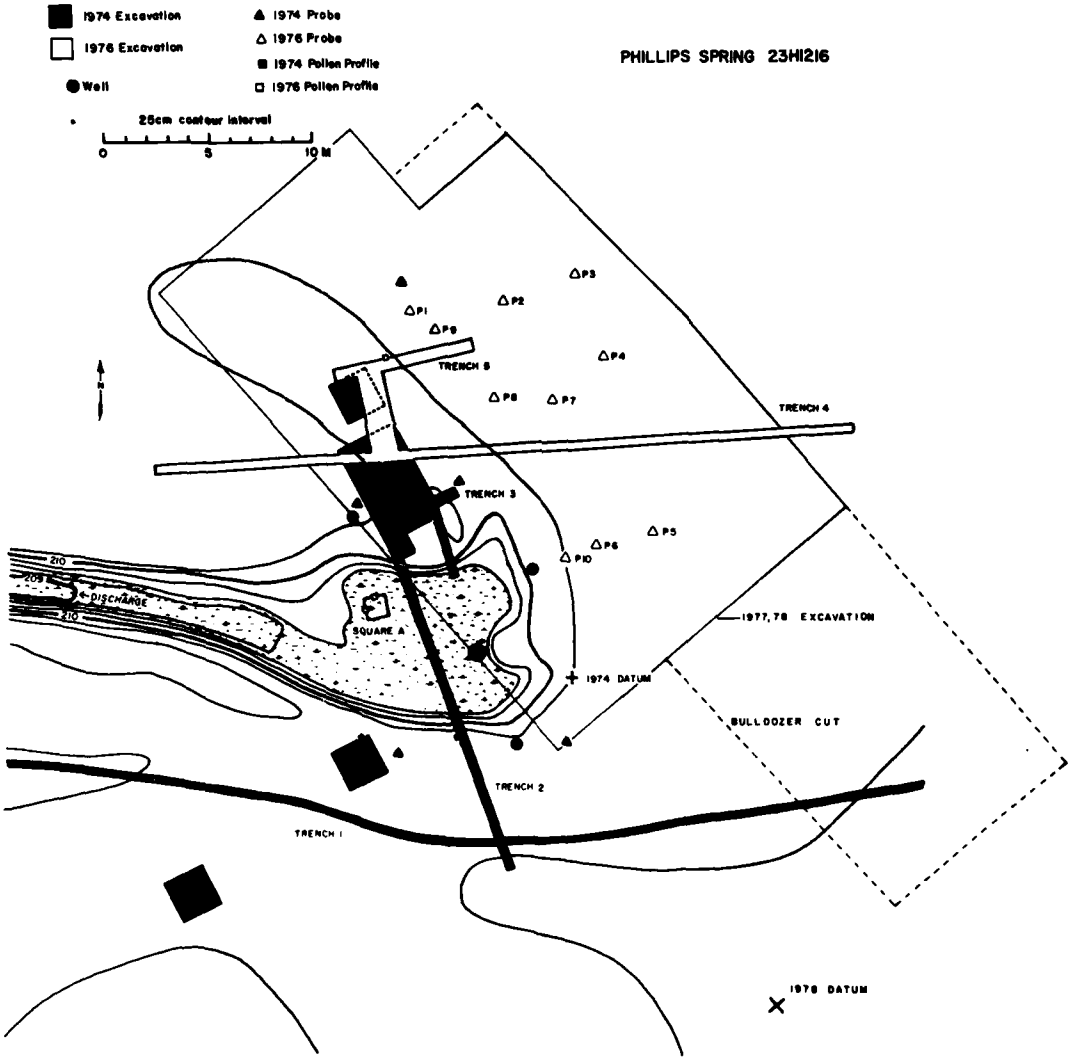

Figure 2. Phillips Spring excavations. 1978 datum is at 540SE504.

camera with a Poloroid back for positive and negative film. This allowed quick evaluation of photographic mosaics of 1 m square tiles, retention of publishable quality negatives, and elimination of costly darkroom time. The photomodule also used a balanced set of four photoflood lamps rather than the two strobe units of 1977. Deep vertical profiles were also recorded with the photomodule because it was impractical to use more time consuming graphic techniques.

Excavation at depth was first initiated in Sq. 510SE508, where in 1977 we had defined the earliest horizons, the Squash and Gourd Zone (unit K^2). Once backdirt was removed with a backhoe, the walls were cleaned and straightened by hand and then sediments below D.D. 4.25 m were carefully shoveled out. This was well below the Squash and Gourd Zone (D.D. 3.35-3.45 m) and our objective was to quickly define the stratigraphy in order to plan subsequent excavation. A block-and-tackle, supported on an "A" frame, was used to remove dirt. The stratigraphic test ended on a sand and gravel aquifer at about D.D. 5.5 m, or approximately 4.0 m below surface. Adjacent squares were then hand-excavated, using procedures previously outlined, to variable depths, providing a continuous profile on the 510S grid line. Profile inspection showed that the Squash and Gourd Zone was the basal archaeological unit.

Selected backhoe trenches were then used to expose the terrace geomorphology. Pollen samples, wood or charcoal for radiometric dating were taken from opportune locations along the backhoe trench walls; two overlapping monoliths were also removed which provided nearly continuous coverage from above the Squash and Gourd Zone at D.D. 3.2 m to D.D. 6.8 m, just above bedrock. After recording and collecting samples, these deep trenches were completely lined with black polyethylene plastic sheeting and then backfilled.

Lastly, a 4-foot length of capped 2-inch diameter threaded steel pipe was buried at the intersection of grid lines 540S and E504. The top of the cap to the galvanized pipe is 1.2 m below the site datum and is approximately 15 cm above the surface.

Matrix processing in the field was an absolute necessity at Phillips Spring. The site, at the end of an axle-breaking road, was too far from any facility where meticulous laboratory recovery could be done. There are also other advantages to on-site processing that go beyond the imponderables of transporting tons of sediment. Most important is that the spring discharge was an uncontaminated water source flowing at a rate appropriate for mass water screening and flotation of perishable, often uncarbonized ethnobotanical specimens. Beyond this, the efficiency and accuracy in on-site checking cataloged processed samples with the excavation work are incalculable benefits. A workable processing system is expensive, but there is no other alternative that costs less in the long run or that affords a greater return on the investment than an on-site system.

In design, the processing system was little different than that of 1977. The same two sets of nested waterscreens were again employed; a single quarter-inch mesh wire screen was also added to increase processing of general level matrix samples. The number of flotation barrels, originally patterned after Jarman *et al.* (1972) and Watson (1976) was

increased from three to five. This also required addition of a second air compressor for flotation agitation. Trisodium phosphate (TSP) was again used to disperse clay from matrix samples. A greater number and volume of unprocessed matrix were also saved as a check on system recovery. The lighter than water fraction, or floated debris, was frozen rather than being allowed to dry, as done previously; all debris retained after the finer sediments were removed has been saved. Both increased water pressure and more efficient spring dewatering were derived from setting two electric pumps in tandem on the main well over the present conduit, and by installing a two-inch check valve on the pump intake tube. This one well (eight-inch diameter) was generally sufficient for spring dewatering. A single valve diverted water to the processing facility or, alternatively, down the spring discharge channel when processing was not being done, resulting in a saving on plastic tubing. Two additional electric pumps, fitted for quick installation, were held in reserve; and a final gas pump was also maintained in case of electric failure or for other dewatering assistance after rains.

The processing facility was housed on a rectangular platform of concrete poured in 1977 with a border of wood pallets on three sides. This assured proper drainage and comfortable though not dry working conditions. One side was below a wheelbarrow ramp that ended at the waterscreens, wheelbarrow loads could simply be dumped directly into the tops of the waterscreens. Opposite this were the flotation barrels and galvanized steel tubs for soaking air-dry matrix in TSP. On one end were two air compressors and an area where standard processing catalog forms were kept and maintained. Collapsible steel frame beds outfitted with sheets of window screen were used to hold samples drying either prior to flotation or both waterscreen and heavier than water flotation fractions.

Virtually all undisturbed matrix from the excavation was processed through this system. The volume did not allow for flotation of all sediment or for waterscreening through one-sixteenth-inch mesh. General level samples were waterscreened through one-quarter-inch mesh unless a living floor or surface was encountered, in which case either one-sixteenth-inch mesh and/or flotation were entertained. Flotation was generally reserved for features or surfaces gridded into 50 cm square units. Even so, it was necessary to terminate excavation several weeks before completing the processing.

EXCAVATION

The electric power line was installed on 2 June. Preliminary site work commenced on 5 June with the re-excavation of drainage ditches and repair of the back wall of the waterscreening area, used as a wheelbarrow ramp. The following day and for the next five days a backhoe stripped backdirt from the 1977 excavation and overburden from an adjacent area on the west to about the 504E grid line; excavation of 2 m square grid units began on 8 June as mechanical stripping continued. On 12 June the 2 m square deep test (Sq. 510SE508) was cleaned of remaining backfill and excavation began in earnest on the large block

bounded by grid lines 504E and 516E (Figure 3a), an area of 228 m^2. By 13 June a number of areally extensive features were defined at either ends of this block and others were exposed as excavation continued over the next three weeks.

Concurrent deep testing proceeded along grid line 510S in squares 510SE506, 510SE508 and 510SE510. These excavations defined a stratified series of stream channel fills beneath the Squash and Gourd Zone and, at greater depth, a yellowish brown gravel aquifer on which the deepest excavations terminated (Sq. 510SE508).

In Sq. 510SE506 a portion of Feature 1173 (initially recorded as Feature 2039), a large hearth partially excavated in 1977, was downfaulted to a depth of 4.1 m below datum, or about 75 cm vertically, by two backhoe trenches that converged at the south wall. One of these trenches was the original 1973 exploratory probe, probably the east trench, but the other trench is not recorded as having been excavated either in 1973 or 1974, and definitely was not excavated in 1976 or since. Both trenches were traced in grid squares north of the 510S line (Figure 3b); the west trench appears to have been beneath Chomko's 1974 excavation. Though it is plausible that the trench was excavated at the end of the 1974 field season, the stratigraphic relationship was obliterated by subsequent slumpage of Trench 4, as shown in Figure 3b, in 1976.

Because of the extensive disturbance in the 4 m square grid unit 506SE506, this area was essentially removed in late June as a block to approximately 4.0 m below datum. Care was taken to excavate the little remaining good deposits. But most of the 4 m square was so severely altered by various backhoe trenches and Chomko's excavations as to make subsequent attempts useless.

An older unrecorded excavation was also noted at the northwest corner of the block and deposits just south of Chomko's test squares to beyond the main well had also been redeposited (Figure 4) during historic times. The northwest corner excavation is too large and in the wrong location to have been the northern most 2 m square Chomko excavated (Chomko 1976:8) and is of unknown origin. Redeposited sediments south of Chomko's spring excavation broke cleanly from a vertical wall that was followed to the 504E grid line, undoubtedly the north end of Trench 2. But disturbed deposits in the spring basin were not within cleanly cut walls, contained farm implements of wood or iron, glass, a fence post with barb wire and, moreover, do not follow the horizontal plan of Trench 2 (Figure 3b): Modification of the spring basin by a former landowner is indicated.

On the morning of 28 June the north wall of Sq. 510SE508 collapsed in a large slab, a harbinger of things to come. This was due to either percolating water from the gravel aquifer and/or near proximity to Trench 4. Seemingly this presented few problems as excavations here and in adjacent 510S squares were complete or nearly so and no undisturbed archaeological remains were apparent in sediments beneath the Squash and Gourd Zone, now excavated. After limited clean-up, the excavation was left for later recording. The difficulty of having more-or-less deep vertical exposures became clear after the 11 July rain that completely submerged the entire block.

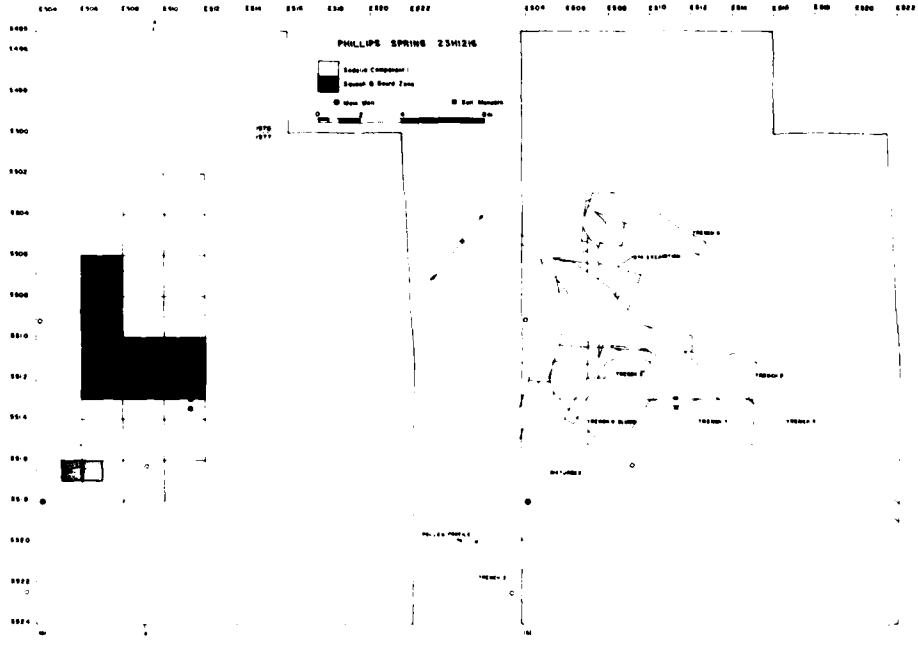

Figure 3. a: The excavation showing 1978 area to left of dotted line, lined and/or shaded grid units where deep excavations were located, A-A' is the line of a composite profile (Figure 5); b: Locations of backhoe trenches, soil monoliths and slumpage within the 1977-78 block.

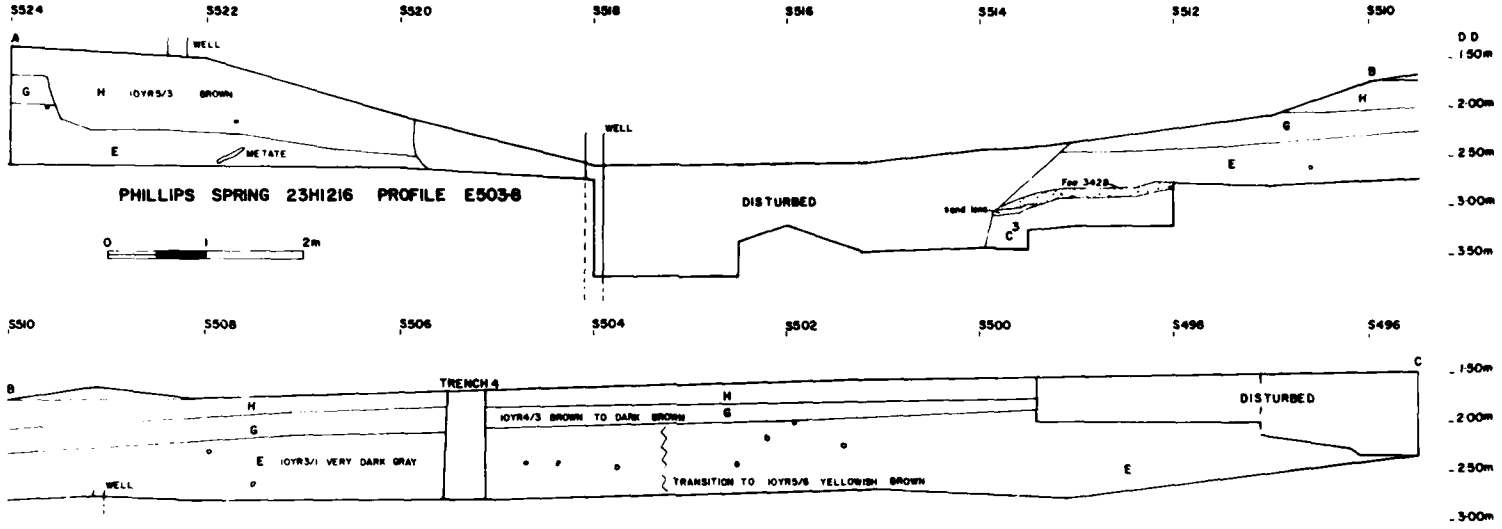

Figure 4. Vertical profile on west side of 1978 excavation block.

The excavation as a whole sustained severe damage due to this rain and a second storm on 14 July. Fortunately, the architectural features exposed before 11 July had been completely excavated and what impact the water had on the horizontal block excavations was largely cosmetic. Due to more pressing priorities, a thorough clean up was not attempted. Excavation on the scale prior to these rains also proved impossible but areal coverage of selected areas within the block continued until the field operations ended. More pervasive was damage to walls exposed in the deeper excavations, especially those on the 512S line. Collapse followed by vertical cracks at variable distances from these walls occurred.

To salvage these deep vertical profiles and as preparation for subsequent pollen sampling at depth, remaining sectors of the 512S wall were cut back to the 513S grid line. This strip, of maximum 1 m width and 6 m length, was subdivided into 50 cm square grid units, excavated in arbitrary 10 cm thick levels or natural units of less than 10 cm thickness to a depth of 3.7 m below datum. A backhoe, brought in on 20 July, was then used to cut a deep trench (Trench 6; Figure 3b) along this wall.

Trench 6 exposed about a 4 m profile, 5 m or so below the surface. At nearly 4 m the yellowish brown gravel aquifer was intersected, below which was a silty clay alluvium and a second gravel. The upper gravel trickled water and eventually gravel began to flow from the wall creating pockets. At 3:30 PM, some three hours after the cutting of Trench 6, the 513S wall disappeared silently into the cut leaving the jagged wall plotted in Figure 3b.

The following day the east end of Trench 6 was extended and two soil monoliths (Figure 3b) were taken from its south wall. The east end of the trench was then backfilled and the remaining western portion was photographed and recorded.

A final backhoe cut, Trench 7, parallel to Trench 6 and incorporating the slumped area (Figure 3b) was completed on 8 August, the day before excavation terminated. This profile resampled the stratigraphy previously exposed by Trench 6 and also reached bedrock at about 7 m below datum. Pollen and charcoal samples were collected and a 3 m section of the wall was photographically recorded.

Field processing was completed on 24 August.

RADIOCARBON DATING

There are twenty-six radiocarbon assays (Table 1) from Phillips Spring. Of these, twenty date archaeological components described later in this report, beginning about 4310 B.P. The six other samples all predate 4310 B.P. and are important in defining the geochronology of the spring or the age of pollen samples. Of the latter, one assay of 8349± 92 B.P. (SMU-518) is on CO_2 gas collected from spring water. This date suggests considerable age of the artesian waters from the spring but this remains to be proven. Enrichment of the water by older carbonates from the Jefferson City dolomite might be a factor.

Weighted average ages (Long and Rippeteau 1974) for two series of

TABLE 1

Radiocarbon Dates

Lab. Number	C^{14} Age $T_{\frac{1}{2}}$ = 5568	Catalog #	Unit	Provenience	D.D.(m)	Material	Reference	Remarks
SMU-78	7870±90 B.P.		C^2?			unc. wood	Haynes and Haas 1974:373	310 cm below surface
SMU-98	4310±70 B.P.		K^2?			charcoal	Haas and Haynes 1975:359	hearth 140 cm below surface
SMU-102	4240±80 B.P.		K^2?			charcoal	Haas and Haynes 1975:359	see SMU-98
SMU-193	7480±80 B.P.		C^2?			unc. moss	Haas and Haynes 1975:360	170-180 cm level below surface
								SMU-78 to SMU-193: from first exploratory backhoe trench, collected by Haynes in 1973.
SMU-234	1990±50 B.P.	15-10	E	160NE108		charcoal	Chomko 1976:23	top of peat layer
SMU-235	3050±60 B.P.	102-1	E	176NE116		charcoal	Chomko 1976:23	feature 1853
SMU-236	2340±80 B.P.	51-1	E	170NE116		unc. wood	Chomko 1976:23	
SMU-237	270±50 B.P.	114-1	H			charcoal	Chomko 1976:23	Trench 2 pit
SMU-238	2910±50 B.P.	22-1	E	160NE108		unc. wood	Chomko 1976:23	
SMU-319	3927±61 B.P.		E			charcoal	Chomko 1978:240	Trench 3 feature 1173
SMU-327	1405±51 B.P.	13-10	G?	160NE108		unc. wood	Chomko 1978:240	
SMU-331	3332±48 B.P.	37-0	E	170NE114		charcoal	Chomko 1978:240	feature 3
SMU-419	3938±66 B.P.	175	E	508SE508		charcoal	this report	Trench 4 feature 1173
SMU-423	3995±96 B.P.	201	E	504SE510	3.29	charcoal	this report	Trench 5 feature 201 upper lens
SMU-483	4222±57 B.P.	1502	K^2?	510SE508	3.25	charcoal	this report	Squash and Gourd Zone
SMU-505	6579±179 B.P.	1640	C^2?	510SE608	3.90	charcoal	this report	see SMU-557
SMU-518	8349±92 B.P.					CO^2		spring water (1977) collected by Haas
SMU-537	2036±58 B.P.	393	E	514SE508	2.85	charcoal	this report	feature 392
SMU-538	1897±84 B.P.	713	E	518SE508	2.75	charcoal	this report	feature 408
SMU-539	5392±86 B.P.		C^2?			unc. moss	this report	1974-1 pollen profile, Trench 2
SMU-550	3650±74 B.P.	823	E	514SE508	2.85	charcoal	this report	feature 424
SMU-554	2245±103 B.P.	808	E	512SE512	2.90	charcoal	this report	feature 415
SMU-556	3960±65 B.P.	1278	E	510SE508	3.30	charcoal	this report	feature 1173
SMU-557	7087±85 B.P.	1640	C^2	510SE508	3.90	unc. wood	this report	see SMU-505
SMU-558	3920±65 B.P.	1453	E	510SE508	3.35	charcoal	this report	feature 1173
SMU-559	3797±177 B.P.	1124	E	500SE508	2.80	charcoal	this report	feature 1124 from 4 m^2

dates have been computed for archaeological components and features described later. The first average of 4257±39 radiocarbon years B.P. is for three dates from the basal archaeological component, the Squash and Gourd Zone, or unit K^2 (Table 1:SMU's 98, 102, 483). The second averages three dates (Table 1:SMU's 319, 419, 558; a fourth date, SMU-556 was stratigraphically reversed and was rejected using the Chauvenet criterion) from Feature 1173 (unit E, first Sedalia phase component) and is 3928±41 B.P.

STRATIGRAPHY AND GEOCHRONOLOGY

This discussion follows Haynes (1978), who organized Phillips Spring stratigraphy into a formal sequence of lettered units that are partly dated by radiocarbon, and employs data from all excavations. Relocating the 1974 excavation, its features and radiocarbon dates has been done with as much care and detail as the original field notes and profile drawings allow. But it would have been impossible to have used these records alone as there are internal inconsistencies in calculating depths of various excavation units. Contrary to Chomko's (1976:12) assertion of plotting artifacts by a "depth below datum," the field records demonstrate that no single vertical reference was employed. Nor has it been possible to reestablish any of the several vertical reference points used. Thus, were it not for unequivocally intersecting in 1978 a living floor initially probed in 1974, it would have been impossible to recalibrate excavations in the adjacent 1974 tests.

Units seen either at the south end of Trench 2 or within apparently undisturbed spring basin deposits exposed by this trench (i.e., J, F) were not present in either the 1977 or 1978 excavations and are not considered. Continuous exposures, new radiocarbon dates, superposition of living floors and intersection of a dated living floor first excavated in 1974 (Figure 5) now allow modification of Haynes' units as follows.

Unit A, the saturated basal stratum, is subdivided into three components based on changes in lithology observed in 1978. A^1 is a gravel of highly patinated chert and rounded sandstone blocks that rests on bedrock. Sorting could not be determined but the gravel probably had an alluvial origin. Clast sizes are generally large, and one piece of sandstone was in excess of 25 cm length, indicating either a local source or high stream competence. Thickness is estimated between 50 cm and 75 cm. Unit A^2 is a silty clay alluvium of approximately 70 cm thickness with high organic content, pebble-size, subangular to round patinated black chert gravels, and abrupt upper and lower boundaries. This alluvium is extremely compact, is roughly impermeable and massive in structure; dry color is a 7.5YR5/2 brown. Unit A^3 is a sorted, yellowish brown patinated chert gravel of about 50 cm thickness that serves as a perched aquifer above A^2. Within this unit fines are mainly sand and the gravel is "clean." Its upper surface makes an abrupt contact with unit C^1.

Age and derivation of unit A are as yet determined. Haynes (1976: 57) notes a similar gravel, a lag deposit at the base of the Boney

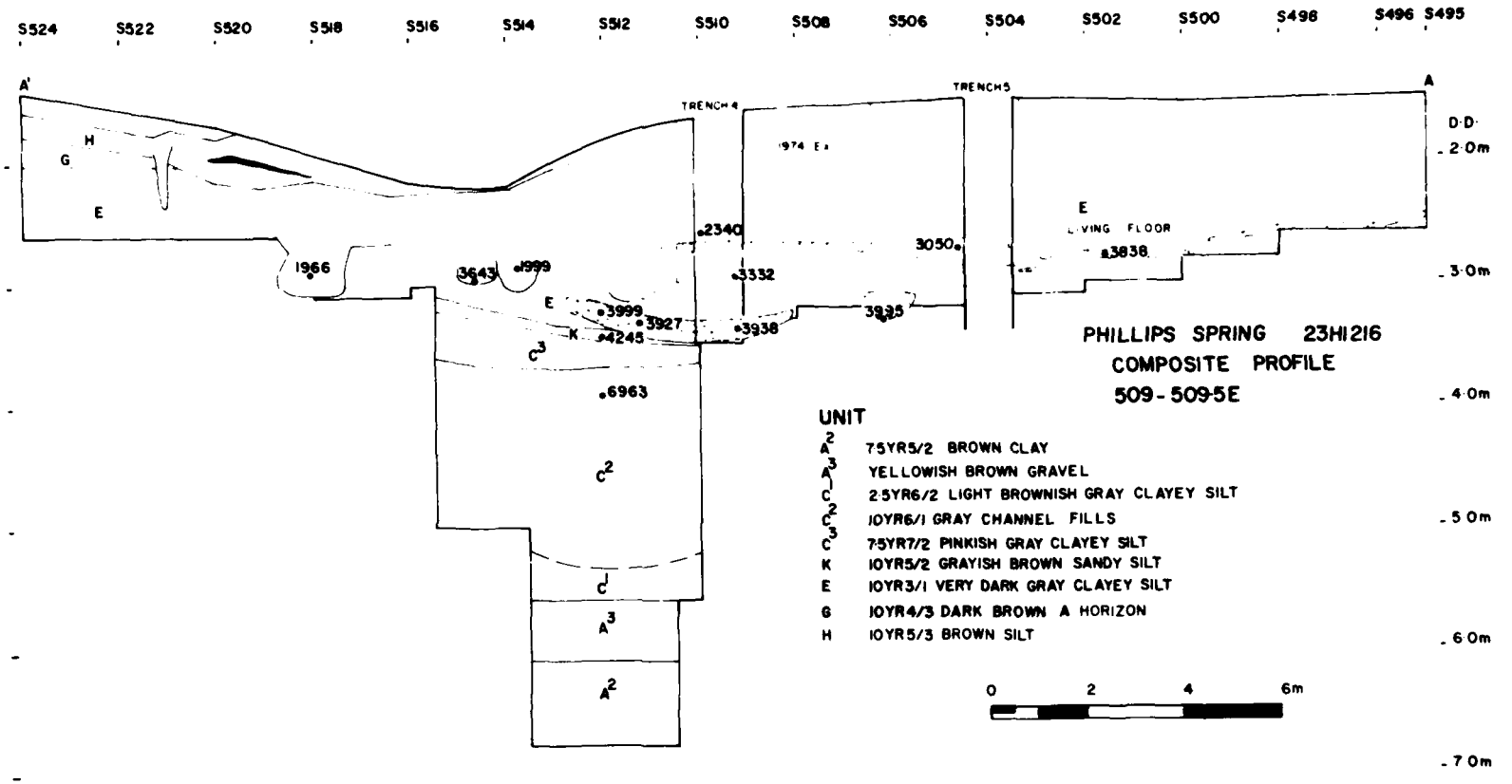

Figure 5. Composite vertical profile between grid lines 509 and 509.5E (see Figure 3). Sections above D.D. 2.6 m are either unrecorded (north end) or are redrawn from the 1977 profile for 508E; 1974 excavations and dates are also depicted on the 508E line. Sections below D.D. 5.0 m are from about 512E. Radiocarbon dates are above or to the right of the filled circles.

Spring formation dated in excess of 25,000 radiocarbon years B.P. Correlation of the two is premature. In any event, unit A is at the base of the Rodgers alluvium, if not its earliest member. Dates from roughly the middle of unit C are in the neighborhood of 7900 to 7400 radiocarbon years B.P. Unit A is conceivably much older, if not in fact being a late or terminal Pleistocene deposit.

Immediately above is unit C, the thickest stratigraphic unit at the site. Unit C is mapped across the terrace, where it assumes the well drained structure and characteristic reddish buff color typical of Rodgers alluvium in lower Pomme de Terre River cutbanks. Artesian discharge supports a cone of saturation that radiates from the spring and in this area unit C is reduced, gleyed and structureless. As distance increases from the spring, unit C becomes more mottled and manganese stained, products of ground water fluctuations. Observations of unit C at depth are from the gleyed sediments near the spring.

As with unit A, unit C is subdivided similarly. C^1, the basal alluvium conformably overlying unit A^3, is a light brownish gray (2.5YR6/2 dry) clayey silt about 40 cm thick. The upper surface is truncated by unit C^2. C^2, a series of cut-and-fills within the Rodgers alluvium (Figures 6, 7) of minimum 1.7 m thickness, is a gray (10YR6/1 dry) sandy clayey silt high in organic matter and charcoal. The fills are laden with either horizontally bedded plant debris or layered sections of moss that still retains a fresh, green appearance. The flat, shallow fill morphology suggests a backwater slough environment rather than a more active river channel. Once established, successive fills adhered to the original north-trending unconformity. The topographic low is still present and had a demonstrable affect on subsequent terrace geomorphology. Gastropods and freshwater mussel shell occur and some of the fills have unmodified chunks of chert, dolomite or sandstone. Lithic artifacts have not been found. Conformably above this is unit C^3, a compound fill of overbank alluvium, a pinkish gray (7.5YR7/2 dry) clayey silt of about 40 cm thickness, cut and deformed by small T-1b channels (Figures 8, 9).

Maximum age of unit C is unknown. Analagous deposits at Rodgers Shelter have radiometric dates of about 10,500 years B.P. (Ahler 1976: 124). Five Carbon^{14} dates are from, or are thought to be from, roughly the middle or upper 40 cm of unit C^2; three other dates are from unit K, which unconformably overlies C^3, providing a minimum age of about 4300 radiocarbon years B.P. Unit C^2 dates include assays in radiocarbon years B.P. of 7870±90 (SMU-78), 7480±80 (SMU-193), 7087±85 (SMU-557), 6579±1[illegible] (SMU-505) and possibly 5392±86 (SMU-539). SMU-557, -505 are assays, respectively, on uncharred wood and charcoal from a single matrix sample 25 cm below the top of unit C^2 (Figure 5); SMU-539 is an assay on moss from the Trench 2 pollen sample 74-1 (J. King 1978). The other two dates are from the 1973 exploratory trench and were collected by Haynes.

Questions remain about the archaeology or lack of it in unit C. The C^2 channel deposits are particularly troubling as the unmodified rock debris seemingly was displaced but a short distance. Unmodified rock composes a sizeable fraction of the material culture in the superior strata and its presence in alluvium from a center-valley location

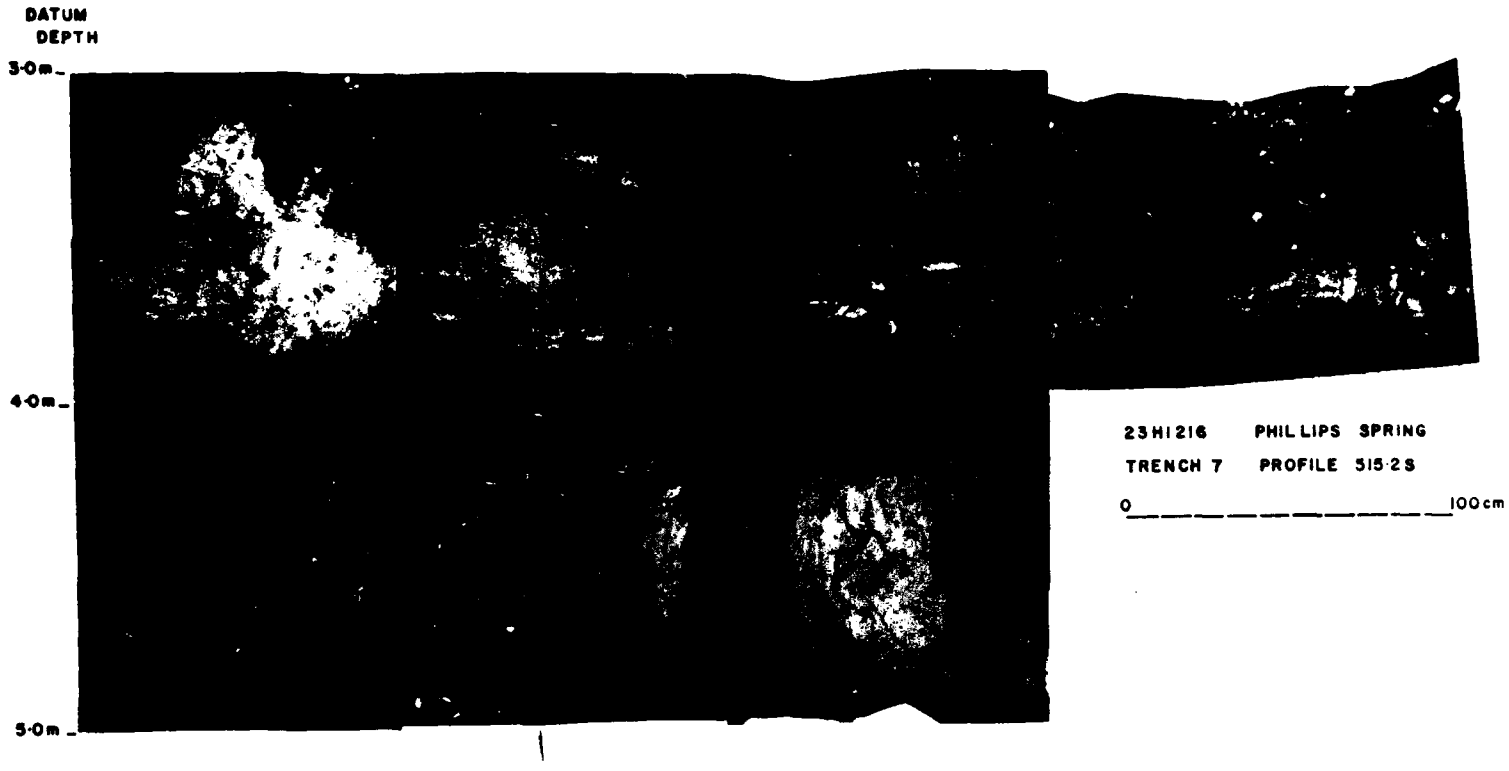

Figure 6. Photomosaic of section of south wall, Trench 7. The east end is at grid coordinates 515.2SE511.64. Note unit C^2 cut-and-fills near base, hickory nut filled pit above Squash and Gourd Zone at top.

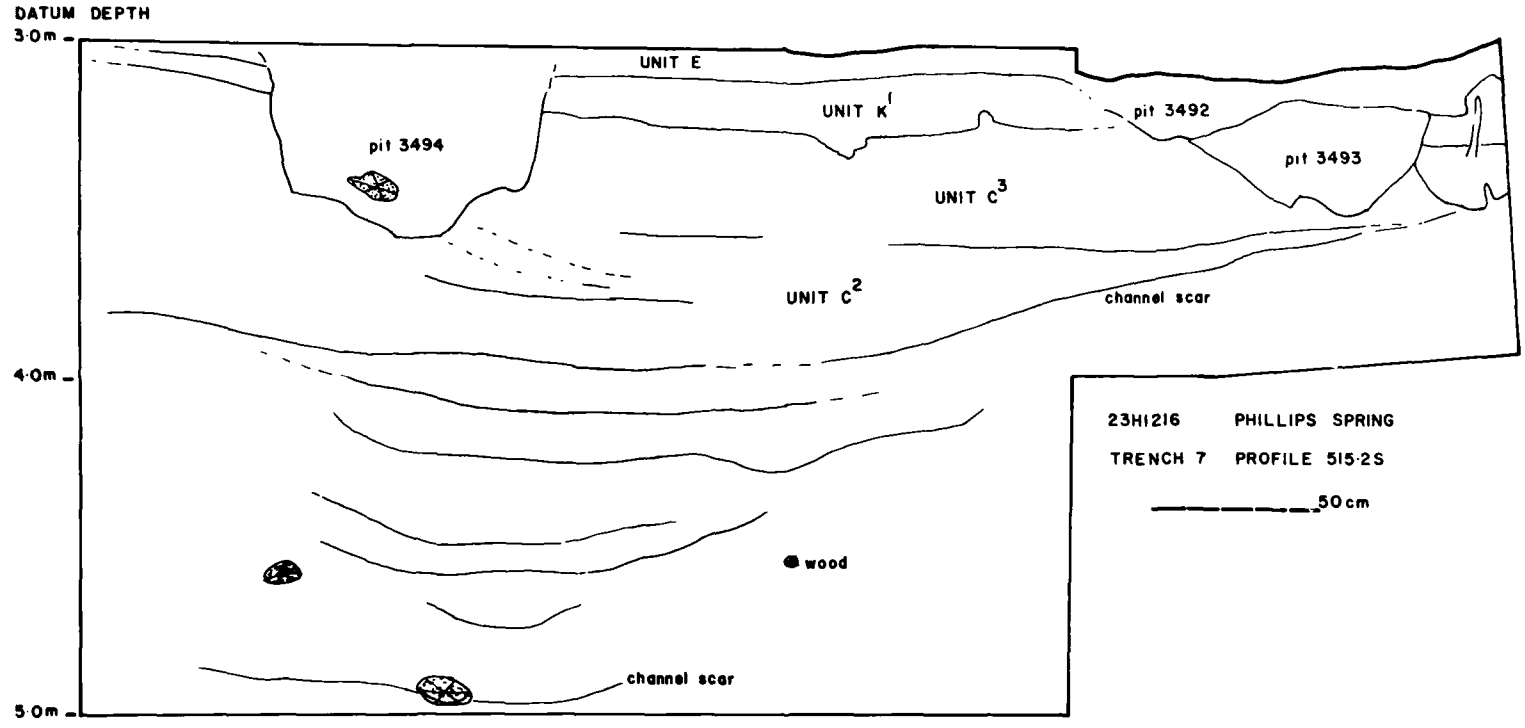

Figure 7. Schematic diagram of photomosaic, Figure 6.

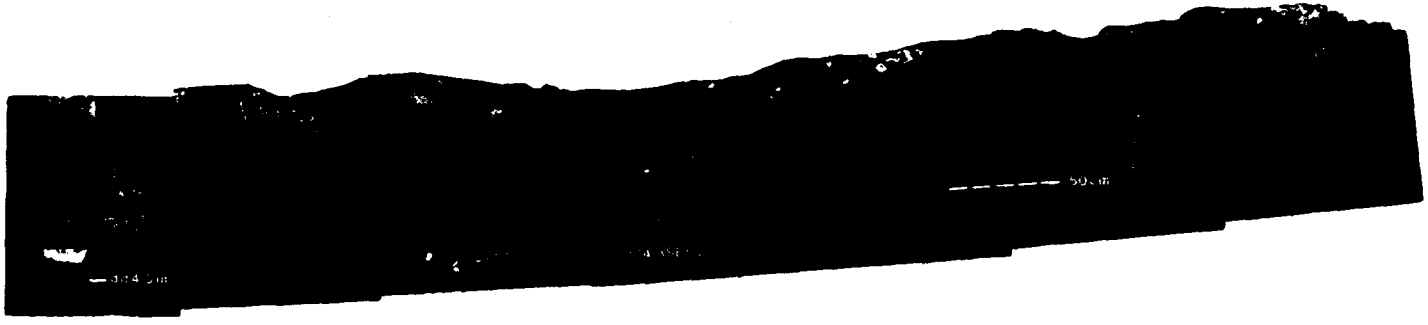

Figure 8. Photomosaic of standing wall after collapse of Trench 6. See Figure 3b for location; note overlap with Figure 6.

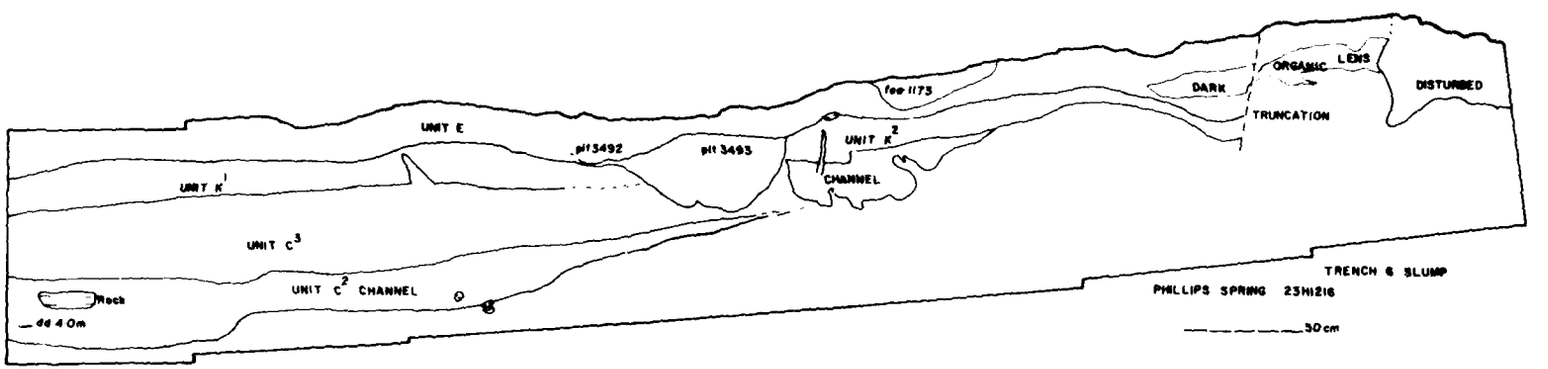

Figure 9. Schematic diagram of photomosaic, Figure 8.

is suspect. I assume that there probably are archaeological components in areas adjacent to the C^2 channels not intersected by the deep tests. A squash seed fragment with dates SMU-557, -505 collected in 1977 from the matrix sample is probably contaminated, introduced in processing or by bioturbation of unit K^2. Both field flotated and unprocessed bulk matrix samples from C^2 were collected in 1978 and it should be possible to suggest whether or not contamination occurred. The single grain of corn pollen from C^2 (J. King 1978) is similarly suspect as contamination, although care was taken in collection and processing of the pollen.

Unit K, the Squash and Gourd Zone, is draped across the top of unit C^3, has a clear dip to the north and east (Figures 5,9) where it follows the eroded C^3 surface. Profile inspection (Figure 10) reveals complex microstratigraphy expressed laterally and vertically as two subcomponents. The lower subcomponent, K^1, is a grayish brown (10YR5/2 dry) sandy silt channel fill with moss and other peaty organics. K^1 predominates in the eastern exposures and in Figure 10 appears to be truncated to the west by the upper subcomponent, K^2. K^2 is horizontally bedded with finely layered white sand from the spring aquifer, contains squash and gourd seeds, various chipped stone or wood tools. One chipped stone point base and a shouldered midsection of a point are identifiable as Sedalia phase artifacts, similar to others found in unit E Late Archaic components. Bioturbation is evident from the sand-filled "crayfish" holes that originate at the base of K^2 and go through the underlying K^1 channel fill, creating in vertical section a plane of sand-filled pockets in the upper portion of unit C^3. Dates in radiocarbon years B.P. include two from the 1973 exploratory trench of 4310±70 (SMU-98) and 4240±80 (SMU-102), and one from 1977 of 4222±57 (SMU-483); all apparently from K^2.

Haynes' (1978) description of unit K includes sediments dated to about 3930 radiocarbon years B.P. This distinction is not followed here as the later dates are from cross cutting archaeological features that originate above unit K. Unit K is between 10 and 20 cm thick.

Unit E conformably overlies unit K. It is essentially an inset into unit C (Haynes 1978) of spring related sediments and overbank alluvium from the Pomme de Terre River: a clayey silt with sand laminae, generally saturated to a very dark gray (10YR3/1 dry) but at distance from the spring mottled to a yellowish brown (10YR5/6 dry). Exposures when dry tend to break horizontally along the sand laminae; low areas occasionally have a columnar structure apparently caused by standing water during phases of high spring discharge and low or no drainage (Figure 11). The unit is of variable thickness on the order of .75 m to 1.25 m and conforms to the spring basin. Radiocarbon dates (Figure 5) reveal that sediments on the north side of this basin are older by as much as 1900 radiocarbon years than those on its south side while at the basin center dates are not appreciably older than those on the north end. Also, the south side dates indicate convergence of older with younger sediments, or collapsed stratigraphy. The range in radiocarbon years is from about 4000 to 1450 B.P.

Stratigraphically, unit E is detailed if not unduly complex. Multiple radiocarbon dates allow an appreciation of intrasite relation-

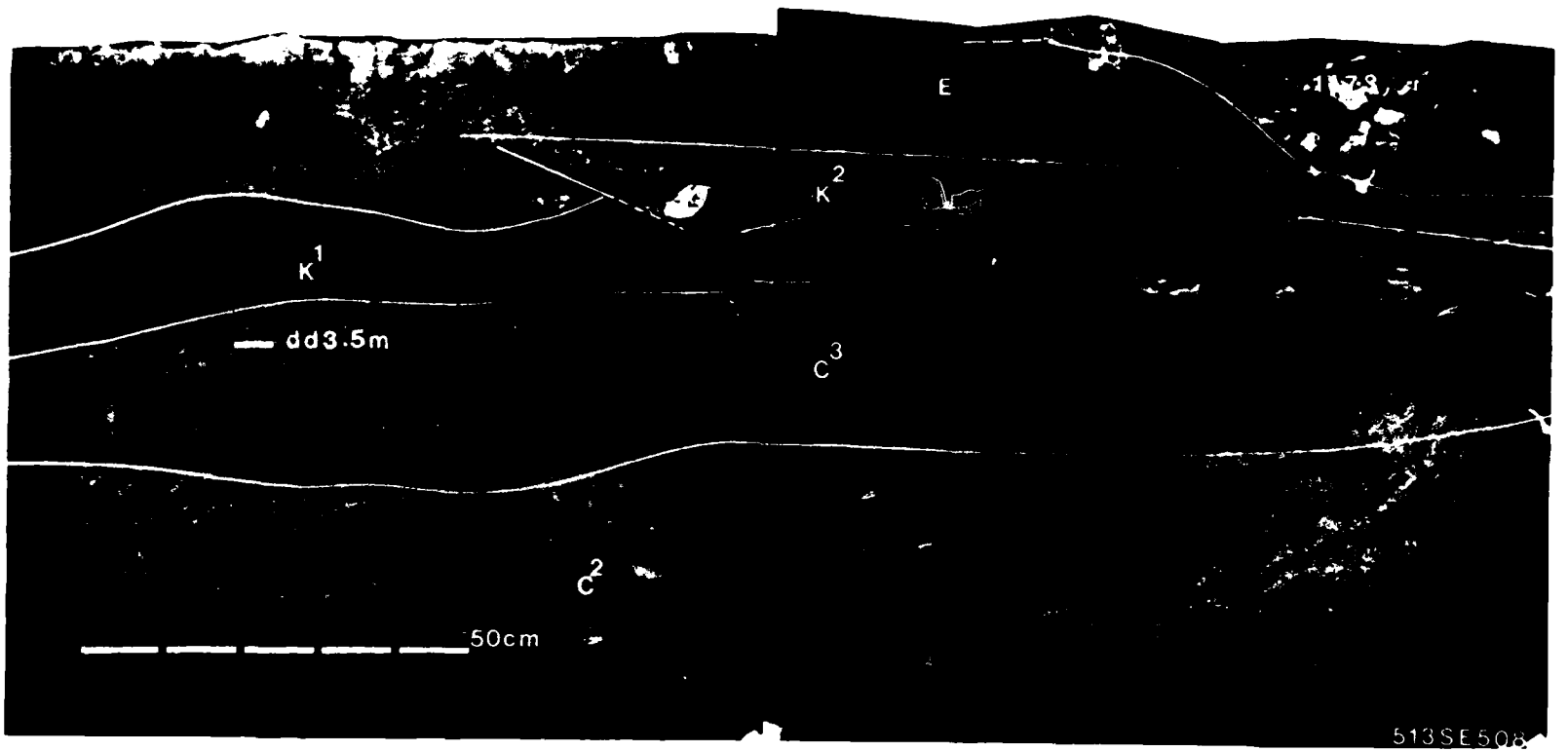

Figure 10. Photomosaic of 513SE508 profile. Depositional units are lettered; features numbered. Note bioturbation (sand filled pockets) at base of unit K^2 extending into unit C^3.

Figure 11. Area planed by bulldozer in 1977 after drainage in early June, 1978. Note largely unvegetated area where water had stood for about nine months causing distinctive columnar structure to formerly flat surface. Similar soil structure is observed in stratigraphic unit E.

ships among several archaeological components. The radiocarbon dates and superposition of living floors delineate five discrete Late Archaic Sedalia phase components. In radiocarbon years these date between 4000 and 3000 B.P. The earliest of the five is an extensive living floor with radiocarbon dates that range from about 4000 to 3930 B.P. Stratigraphically above this is an undated living floor, of either short duration or not as intense usage. A third component is defined also as a series of interrelated living floors with one dated 3797±177 radiocarbon years B.P. (SMU-559). Above this is the fourth, another extensive living floor. Component 4 may or may not correlate with a storage pit dated at 3650±74 radiocarbon years B.P. (SMU-550), or with another pit dated at 3332±48 radiocarbon years B.P. (SMU-331). A final floor, mainly excavated in 1974 and intersected in 1978, has a date of 3050± 60 radiocarbon years B.P. (SMU-235). This last floor has been characterized by Chomko (1976:23) and Haynes (1978) as a unit D, depicted as being below unit E. In reality, however, this fifth component is well above the boundary between units K and E (Figure 5). Plotted artifacts above component five suggest a sixth Sedalia unit. Other dated storage pits indicate that at least some were dug during a Middle Woodland occupation(s) of the site. At the south end (Figure 12) a final Woodland unit is defined at the boundary between units E and G, a buried A horizon.

Unit G is a soil stratigraphic unit consisting of a brown to dark brown (10YR4/3 dry) A horizon over a dark grayish brown (10YR4/2 dry) textural B horizon in the upper 20 cm of unit E. On the west side of the excavation near the spring this buried soil is truncated by a channel scar, unit H (Figure 4). The B horizon is angular blockey in structure and gradually grades into the A horizon. Age of the buried soil is estimated to be about 2000 years B.P. and younger, consistent with the date of 1405±51 B.P. (SMU-327).

Unit H, a brown (10YR5/3 dry) silt, records a cut-and-fill cycle near the spring and unconformably overlies units E and G. Pits and a charcoal lens originate at variable depths in this fill, a compound channel deposit. A date of 270±50 radiocarbon years B.P. (SMU-237) is on charcoal from one of these pits. The upper 15 cm or so are disturbed by modern cultivation and the fill is mainly exposed on the south side of the spring basin. Unit H appears to be a local expression of the youngest lower Pomme de Terre alluvium, or Pippens, having an earliest date of 840±60 radiocarbon years B.P. (Tx-1454) (Haynes 1976: 58) that represents the abandonment of the Rodgers Terrace in the valley.

FEATURES

Features excavated in 1978 include living floors, or domestic scatters, either with or without other architectural remnants, pits and hearths. Numerous small circular stains proved not to be post molds. No wood posts were found either though several were found in 1977.

No architectural features, except possibly pits intersected by

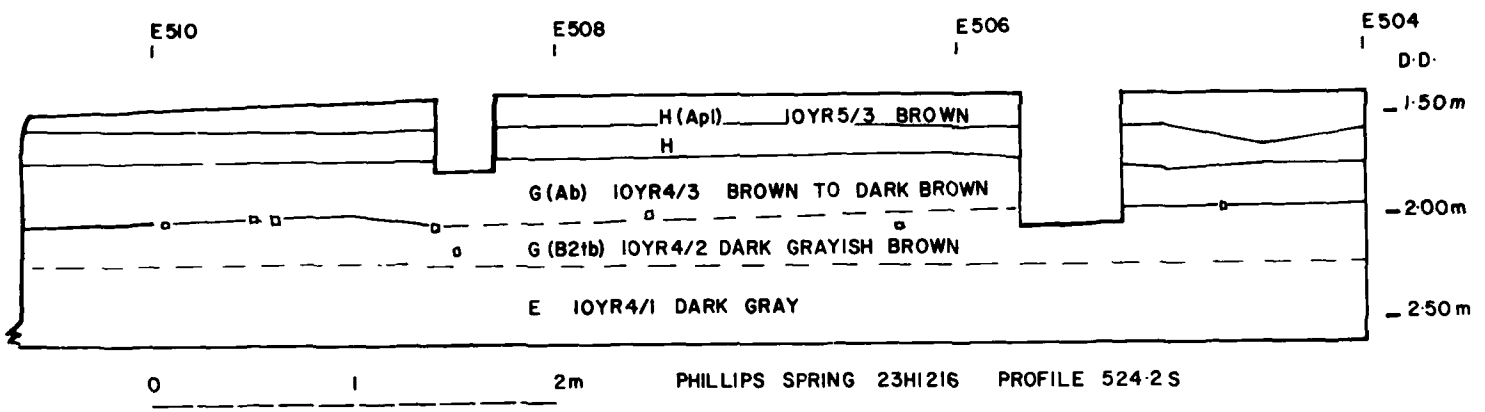

Figure 12. Schematic diagram of 1978 south profile wall. See also Figure 4.

backhoe trench 7 (Figures 6, 7), were recorded in unit K. And it is too soon to evaluate the potential interrelationships among debris from unit K, save for identifications of diagnostic artifacts described later.

Sedalia phase, Middle Woodland or unknown age features were delineated by unit E excavations in each of the four field seasons. Features mapped in each of these field seasons are discussed by individual unit E component, those features excavated in 1978 described, and the distribution of all recorded features and diagnostic artifacts provided by respective component if known. Refer to Figure 5 for stratigraphic contexts of the Sedalia phase components.

UNIT E SEDALIA PHASE COMPONENT 1: 4000 to 3920 Radiocarbon Years B.P.

Features of this component were first intersected by backhoe trenches in 1973, 1974 and 1976. Chomko's (1976; 1978; Chomko and Crawford 1978) "Feature 2" that he associated with radiocarbon dates from unit K is, in fact, from this component and on the basis of the 1977 excavation is now referred to as Feature 1173, initially described as from the "second Sedalia complex component" (Kay and Robinson 1978).

Three extensive features were excavated in 1978. Two of these, features 201 and 1173 (Figure 13), were considered initially as a single large basin of about 64 m^2 with potential associated exterior architectural features (Kay and Robinson 1978); however, the 1978 excavation showed them to be separate. Feature 1173, especially, had sustained severe damage due to backhoe trenching. Accurate measurement and feature matrix samples collected in both 1977 and 1978 allow comparison with Feature 201. The two are large linear hearth basins filled with rock and other cultural debris with an orientation roughly to magnetic north, which coincides with the underlying unit C^2 trough. They are part of a large living floor, Feature 3272, which was partly excavated (Figure 14a,b) in an area of 86 m^2. No posts or other structural remnants were excavated from the living floor. Considering the scale of the two hearth basins, evidence of a structure--either a pen or roofed dwelling--could well be at some distance. The matrix is a clayey silt ranging from dark gray (10YR4/1 wet) to a very dark gray (10YR3/1 wet). Lithic debris includes a range from finished tools to unmodified rock.

A preliminary listing of artifacts from this floor and associated features is in Table 2.

Feature 1173 is an oval basin of about 7.0 m length, 2.4 m width and maximum depth of 40 cm with gently sloping walls. Surface area is 12.34 m^2. By any measure this is an unusually large linear hearth with no other analog at Phillips Spring other than Feature 201, about 1.4 m to the north. The south end is slightly elevated over the north end (respectively, 3.1 m to 3.21 m below datum) and maximum depth near the center is 3.5 m below datum, where it crosscuts the Squash and Gourd Zone (unit K^2). The feature basin was intentionally prepared. Care may have been exercised in selecting a topographic low, thus minimizing the extent of excavation. The black (10YR2/1) silty matrix is charcoal rich with a large quantity of burned dolomite and some ash. But there

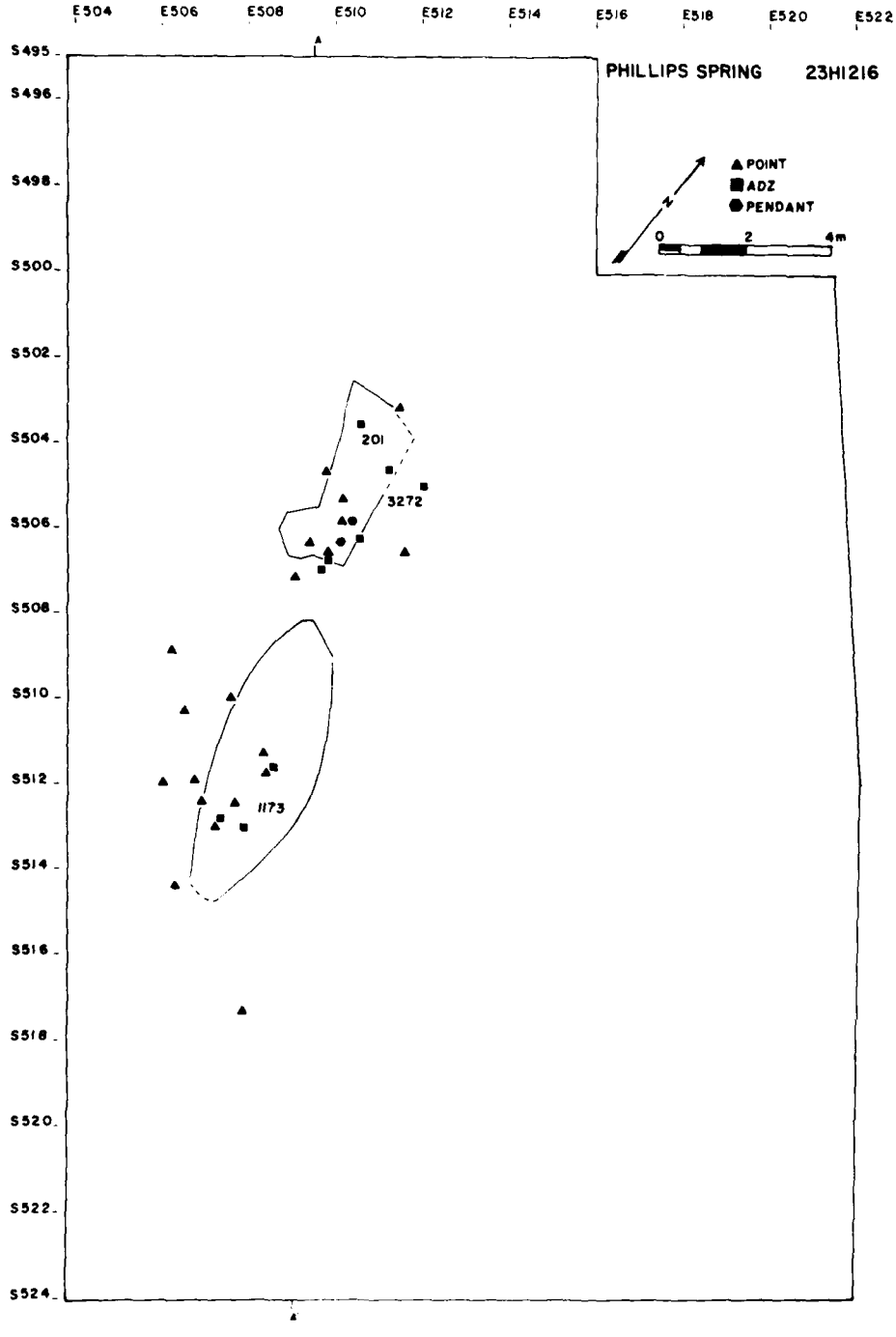

Figure 13. Features, unit E Sedalia phase component 1. Refer to Figure 3a for illustration of excavation area of 86 m^2.

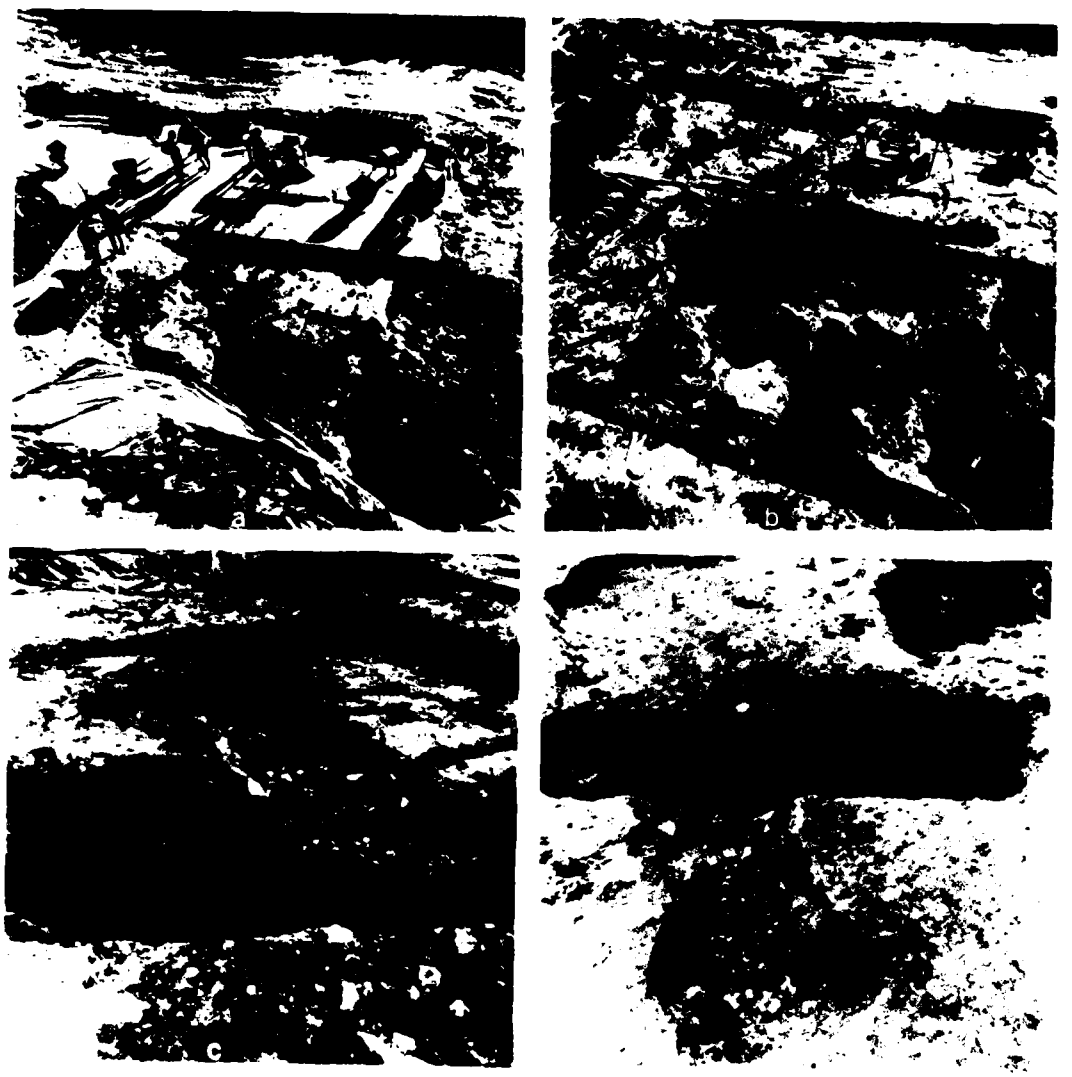

Figure 14. Views of unit E Sedalia phase component 1: a, during excavation, note rock concentration (Feature 201) and photomodule in upper right; b, after excavation of Feature 201 and living floor 3272, Trench 5 intersecting northern portion; c, north end Feature 201 with profile exposed in Trench 5; d, looking south across excavated basin of Feature 201.

is no clear oxidation of the pit walls, perhaps due to post depositional sediment reduction (i.e., chemical alteration). The pit walls are differentiated by changes in texture, color, sharp reduction in rock content. Visual inspection does not indicate any necessary differential deposition. Mussel shell is layered in the pit; vertebrate remains are also present. F. King's (1978) analysis of feature ethnobotany notably includes squash and gourd seeds. Chomko also recovered squash seeds in 1974; as determined from the location of his Trench 3, his field descriptions and similarities in radiocarbon assays. Dates in radiocarbon years B.P. are 3927±61 (SMU-319; 1974 excavations), 3938±66 (SMU-419), 3960±65 (SMU-556) and 3920±65 (SMU-558).

TABLE 2

Unit E Sedalia Component 1 Artifacts*

FEATURE	POINTS	ADZ	BIFACE	CORE	HAMMERSTONE	GROUND STONE	PENDANT
201	3046	174	3269	3270	3376	3335	3261
	3357	3268	3372			3404	3359+
	3408	3369	3405				
		3439	3415				
1173	1176	1177	3112	3420		3270	
	1283	3123	3127				
	3129						
3272	3259	3258	3341	3339		3327	
			3344	3340		3328	
				3343		3329	
						3330	
						3331	
						3332	
						3242	
						3247	

*Preliminary; note also hematite from Feature 3272, possible wood tool from Feature 1137; catalog numbers listed.
+Undrilled blank

Feature 201, an irregularly shaped prepared basin, is 4.25 m in length, about 2 m wide and of variable depth, with a maximum thickness of about 30 cm. Surface area is 5.9 m^2. Although much smaller than Feature 1173, it has a similar matrix and wall definition. There is no mussel shell. The pit originates at an average depth of 3.1 m below datum and is differentially filled with two discrete lenses visible in both the south and north parts (Figure 14c). At least one squash seed was noted in excavation in 1978 but none was found in the 1976 trench 5 matrix sample (F. King 1978). A single charcoal sample from the upper lens is dated 3995±96 (SMU-423) radiocarbon years B.P.

UNIT E SEDALIA COMPONENT 2

This component is defined by a partially excavated habitation surface, Feature 3351 (Figure 15), stratigraphically above the first component Feature 3272 and beneath the third component Feature 1124. On the north the feature ends in 2 m grid squares 500SE508 and 500SE510 and it continues into the profile on grid line E512 south of the 500S line. Systematic excavation was in three 2 m grid squares, 500SE508, 502SE508 and 502SE510 (Figure 16). Profile inspection also shows that the feature extended into 2 m squares 504SE510, 506SE510 and 508SE510.

The surface is a rock scatter highest in the north or west (depth below datum:2.85 m) and dipping to the south or east (D.D. 3.06 m) with a thickness of generally less than 10 cm. There is a small oval area of burned earth and charcoal on the north end that may represent an unprepared hearth or fire. The matrix is mainly a dark grayish brown (10YR4/2 wet) clayey silt mottled to a light olive brown (2.5Y5/4 wet) or a yellowish brown (10YR5/6 wet). Bone is present in small quantities but no botanical specimens were obvious in excavation. Lithic artifacts are numerous; a preliminary list follows (Table 3):

TABLE 3

Feature 3351 Artifacts*

POINTS	ADZ	DRILL	BIFACE	CORE	GROUND STONE	HEMATITE
3059	3260	3058	3027	3035	3373	3053
3353	3356		3043	3354		
			3223			
			3224			
			3225			
			3312			
			3352			
			3353			

*Preliminary; catalog numbers listed.

UNIT E SEDALIA COMPONENT 3

Excavation of this component was an extension of those conducted in 1977, that resulted in final definition of two domestic floors, Features 1124 and 1126. The reader is also referred to Robinson's (1978) descriptions of Features 413, 908, 1125 and 1127. All features are diagrammed in Figure 17.

Feature 1124 was largely excavated in 1977. But more of this very impressive floor was found to the west of the 1977 block. The dimensions are: length, 6.2 m; width, 2.4 m; with the main axis on magnetic east-west. The shape is oblong rather than clearly rectangular. There are variable densities of rock across this floor which may accord a different view of its geometry, when detailed study is complete. The feature is bounded by grid unit 500SE506, a 6 m by 4 m rectangle with

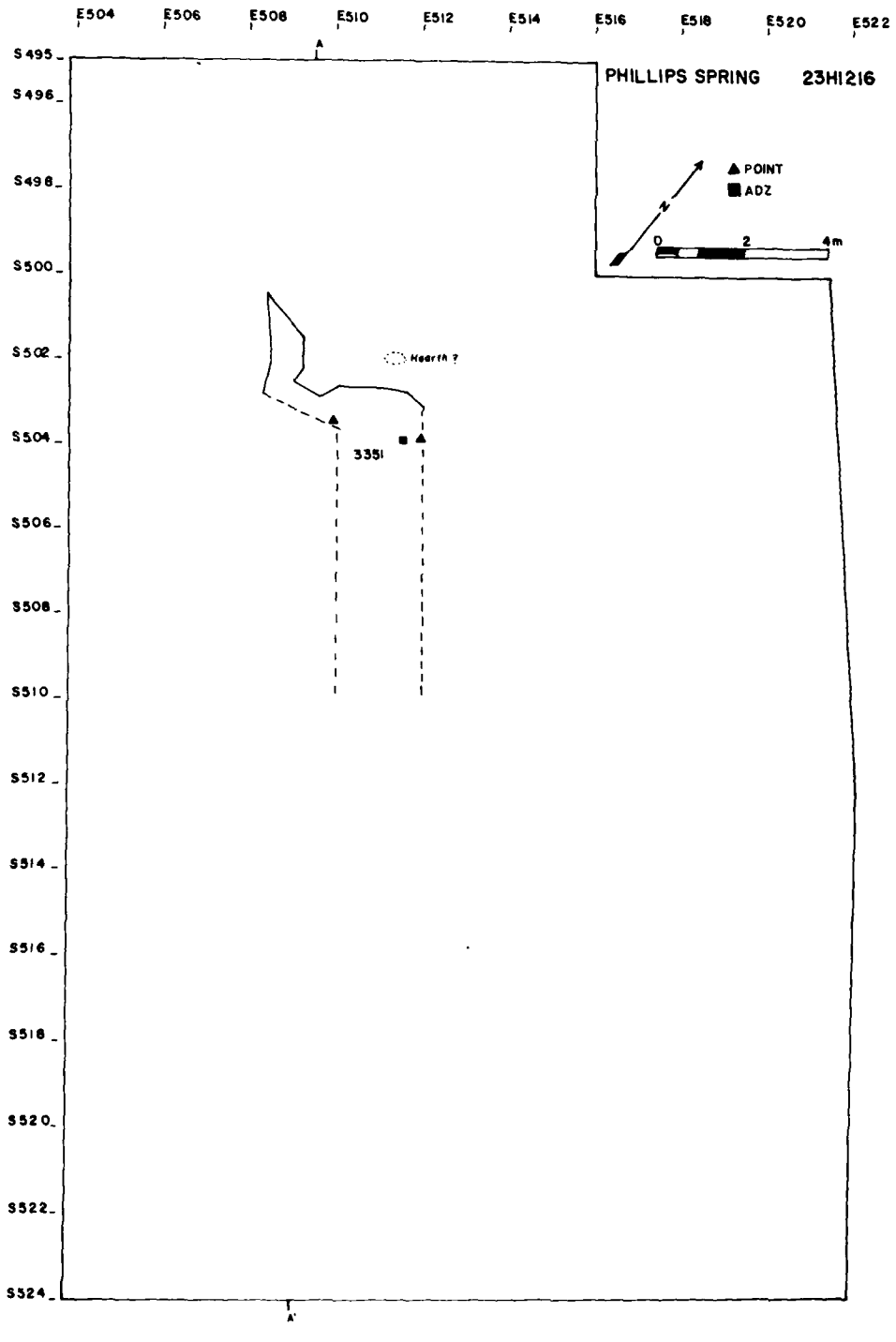

Figure 15. Unit E Sedalia phase component 2.

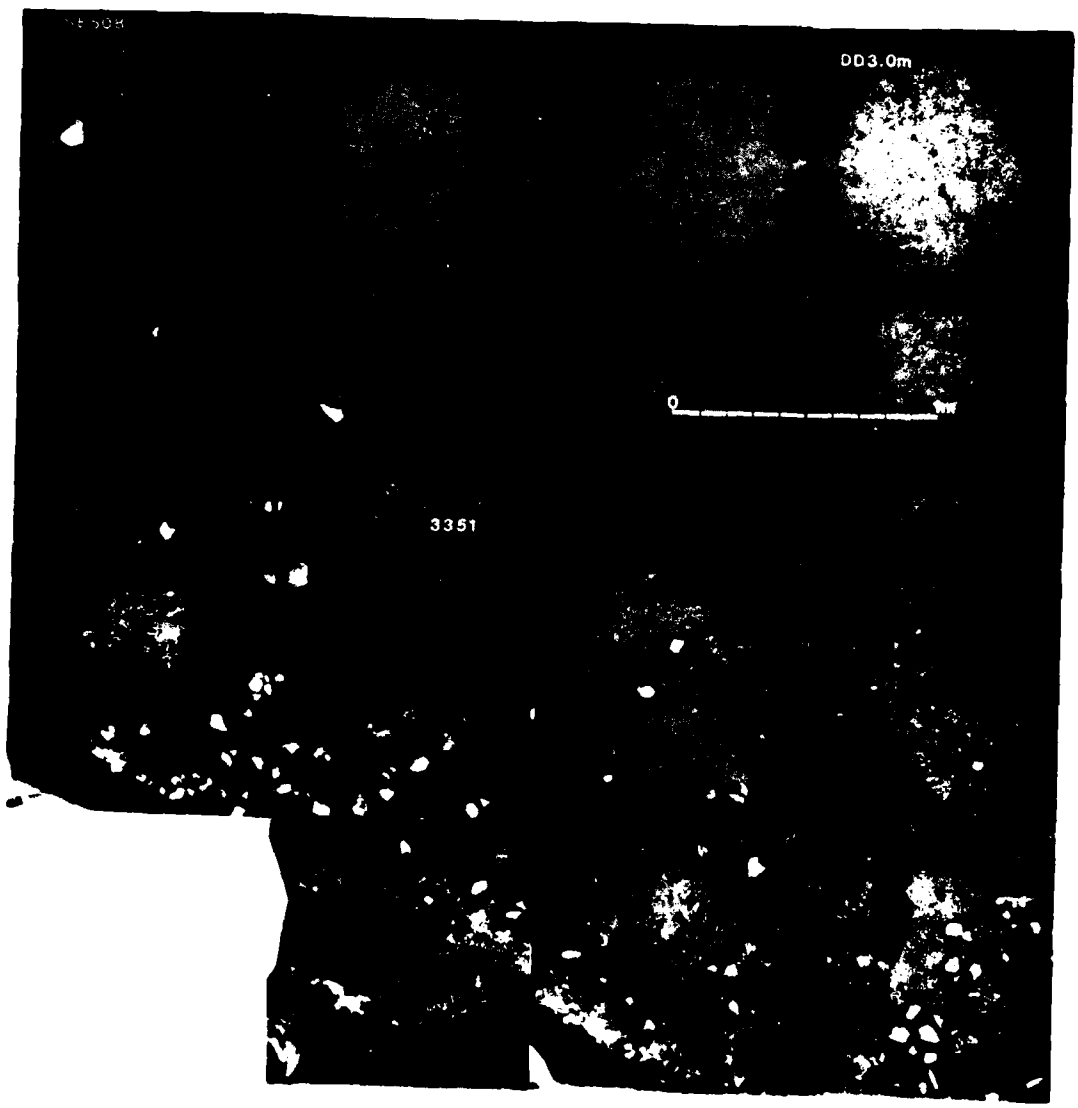

Figure 16. Photomosaic of Feature 3351, second Sedalia component, in 4 m grid unit 500SE508.

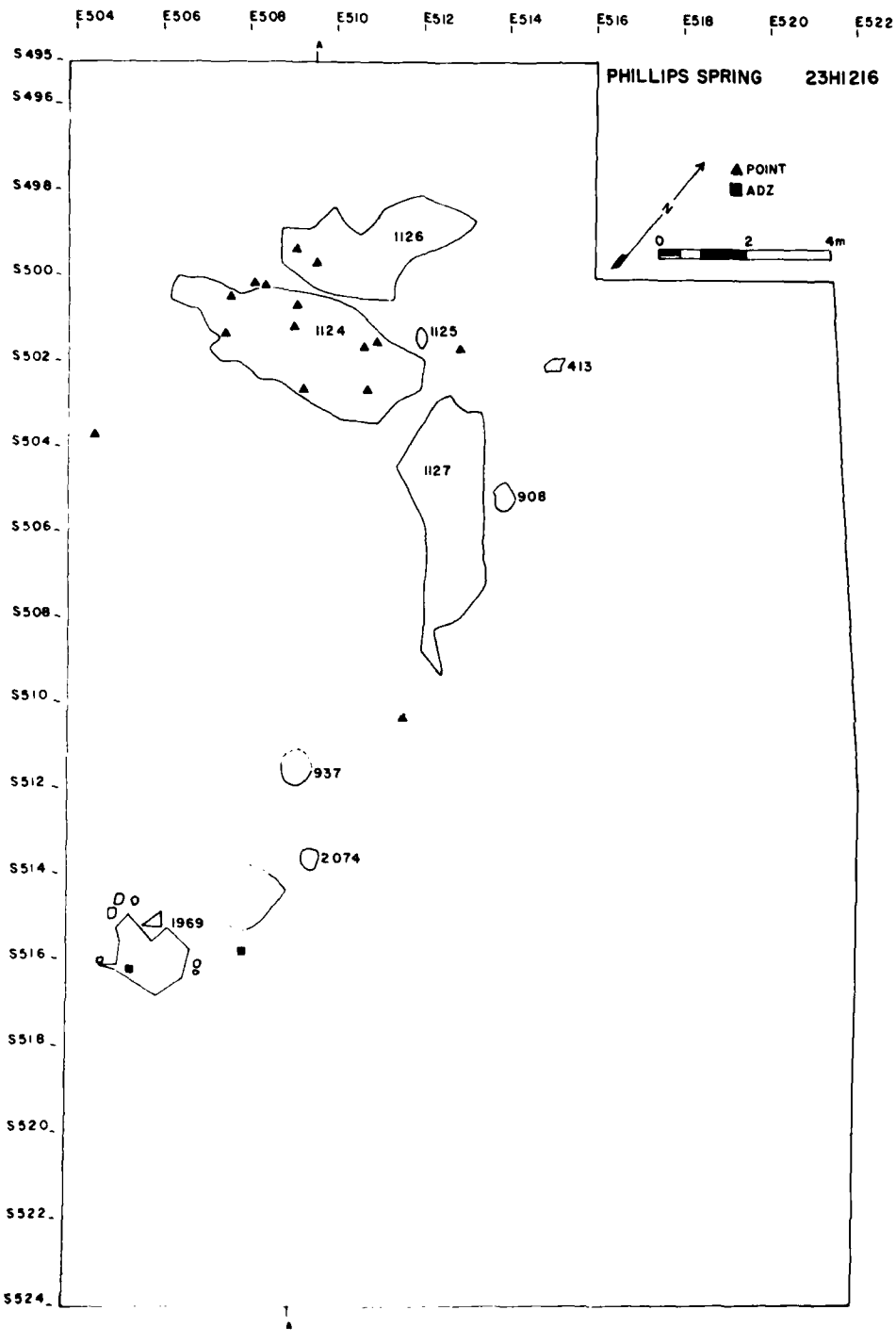

Figure 17. Features, unit E Sedalia phase component 3.

length east-west. Total area is 10.35 m^2. General thickness is about 4 cm and there is a perceptible incline on the west side, where the base is 2.75 m below datum. Elsewhere the feature ends about 2.82 m below datum. Feature fill is usually a dark gray (10YR3/1 wet) silt, clearly distinguished from the surrounding yellowish brown (10YR5/6) clayey silt matrix, but on the west becoming more mottled and grading into the surrounding matrix. Calcined bone, charcoal, uncarbonized nut hulls, a variety of lithic tools and debitage are present in the fill. Potential post features, noted in 1977, were not clear in 1978 and are believed to be short-term effects of groundwater; no undisputable posts are identified with this or associated floors 1126 and 1127. A date in radiocarbon years B.P. on charcoal from Feature 1124 is 3797± 177 (SMU-559).

Feature 1126 is immediately to the north and may prove to be an extension of Feature 1124 (Figure 18). Aside from proximity, similarities with Feature 1124 include its fill, complement of lithic tools or manufacture by-products. The scatter of debris is irregular in shape and orientation though with an overall northeast-southwest trend. Maximum dimensions are 4.6 m length, 2.1 m width, with a surface area of 6.03 m^2; thickness is about 4 cm. The feature is on an incline that, on the north, begins at 2.76 m below datum and, on the south, ends at D.D. 2.82 m, the basal depth of Feature 1124. Similarly inclined is the basal surface of Feature 1127. Preparation (i.e., leveling) of these surfaces is not evident; they appear to have conformed to the landscape.

Table 4 is a preliminary listing of artifacts from component 3 features.

PROSPECTIVE COMPONENT 3 FEATURES

Figure 17 also depicts five features, three pits, two rock concentrations, and one ill-defined stain of little depth (see Figure 6) that on stratigraphic grounds are from Sedalia components 1, 2 or 3. For purposes of discussion only, these are included with component 3.

Feature 937, a pit excavated in 1977, has been described by Robinson (1978) and will not be further considered.

Feature 1969 is an amorphous rock concentration in 4 m grid square 514SE504 with maximum dimensions: 2.45 m (northwest) and 2.40 m (east-west), 25 cm thickness, 3.33 m^2 area. On the south a 1977 drainage ditch intersects, while on the west the feature is truncated by modern disturbance, described previously. Occasional historic items were found in the upper fill. Usually it was clear that these were obviously intrusive and I have no doubt that the feature is prehistoric. The feature surface is of irregular depth--the highest elevation being D.D. 2.78 m and the lowest, 2.91 m below datum--and is tightly packed with rock (Figure 19). Much of this is ground stone slabs with a scattering of chipped stone tools or debitage. Most of this debris ended at a depth of 2.90 m below datum, with pockets of feature fill extending to about 3.03 m. The fill is a very dark gray (10YR3/1 wet) clayey silt high in organic matter. A sand lens about half-way through is suggestive of compound deposition. Beneath this is a discontinuous black

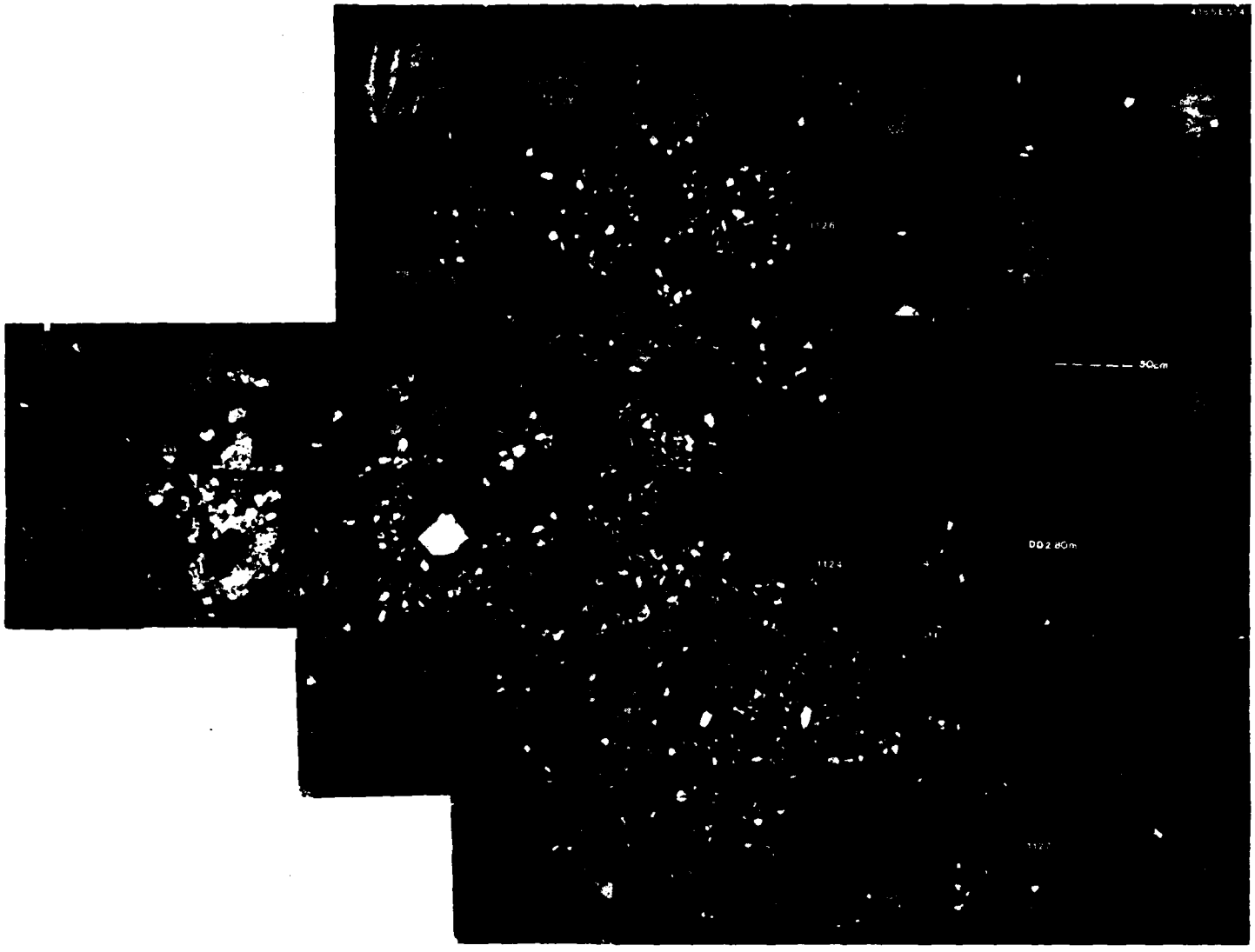

Figure 18. Photomosaic of Features 1124, 1126.

TABLE 4

Unit E Sedalia Component 3 Artifacts*

FEATURE	POINTS	BIFACE	CORE	GROUND STONE	HAMMERSTONE	HEMATITE
1124	247	283	949	984	995	996
	280	950	974	1001		1049
	284	955	975	1053		
	286	956	981	1085		
	289	963	1003			
	810	982	1034			
	811	1006	1036			
	814	1027	1048			
	899	1037	1072			
	1035	1066	1099			
	1153	1067				
	2014	2013				
		2015				
1126	1921	1919	1938			1933
	1922	1920				
	1923					
1127		421	773			767
		716				
		1052				

*Preliminary; catalog numbers listed.

(10YR2/1 wet) peat overlying a second very dark gray (10YR3/1) clayey silt, distinguished from the feature fill by a sharp reduction in cobble-size rock, ending about 3.20 m below datum. A second dark brown (10YR3/3 wet) peat with sand at its base was followed in a small excavation from 3.20 m to 3.54 m below datum and probably is stratigraphic unit K. Artifacts found in the feature fill and underlying sediments are listed in Table 5.

To the east of Feature 1969 at a depth of D.D. 3.0 m was a large organic stain with a clearly defined east edge in 2 m Sq. 514SE508 (Figure 17). Repeated troweling, wetting and drying of this surface did not lead to better definition of this stain nor was it visible in the Trench 7 profile. Exactly what this stain was is unknown.

Less enigmatic was Feature 2074, a small pit in 2 m grid square 512SE508. The pit was noted as an oval black (10YR2/1 wet) stain, 56 cm by 45 cm, at a depth of 3.00 m below datum. The fill is a clayey silt with decomposed dolomite, quartzite pebbles, chert flakes and charcoal but no finished tools, extending about 3 cm. Probably the pit was a small basin, first intersected in the 10 cm level between D.D. 2.90 m and 3.00 m, reaching a maximum depth of D.D. 3.03 m.

Similar to this was another pit, Feature 1990, in 2 m grid square

Figure 19. Photomosaic of Feature 1969.

TABLE 5

Feature 1969 Artifacts*

SEDIMENTS	POINTS	ADZ	DRILL	BIFACE	GROUND STONE
Feature Fill	2009	2018	1930	2007 2008	1969+
1st Peat Lens				2078 2079	
Clayey Silt		1941			
2nd Peat Lens					3003

*Preliminary; catalog numbers listed.
+Several individual specimens.

516SE506. This was an oval black (10YR2/1 wet) stain, 31 cm by 24 cm, first noted at D.D. 2.98. The fill is a clayey silt, high in charred and uncharred plant remains, ending at D.D. 3.05 m. The main difference between the fill and surrounding matrix was the presence of organics in the fill; chert flakes were also found at the base of the pit, which is basin shaped. There were no other artifacts.

A final feature, Feature 3428, closely resembles the fill of Features 1173 and 201. Probably it is another rock-lined hearth. But it was only partially excavated, as it extends into the west profile (Figure 4) in 2 m grid square 512SE502 and north into 2 m grid square 510SE504; the eastern portion was apparently destroyed by Trench 2. Feature 3428 is, relative to length, a thin lens beginning at 2.80 m below datum and extending downward to about D.D. 3.00 m. A little less than 2 m of the feature is exposed in the west profile and it dips gradually to the south. The fill is a very dark gray (10YR3/1) to black (10YR2/1) clayey silt with light gray (10YR7/1) to white (10YR8/1) sand mottling. The fill, high in rock, chipped stone debris, charcoal and mussel shell is less compact than either the overlying very dark grayish brown (10YR3/2) sediment or underlying dark gray (10YR4/1) matrix. On the south Feature 3428 overlies a laminated white sand, which may be spring feeder deposits. Two chipped stone artifacts, a biface and an adz (respectively, catalog numbers 3429 and 3431), were excavated from the feature.

UNIT E SEDALIA COMPONENT 4.

This component is defined by a single large living floor, Feature 1788, that is above component 3 features (Figure 5) in the northwest corner of the excavation. The horizontal plan of this feature and other prospective component 4 features is shown in Figure 20. Two of the latter (Features 424 and 3, respectively) are dated 3650±74 (SMU-550) and 3332±48 (SMU-331) radiocarbon years B.P. Either date may be

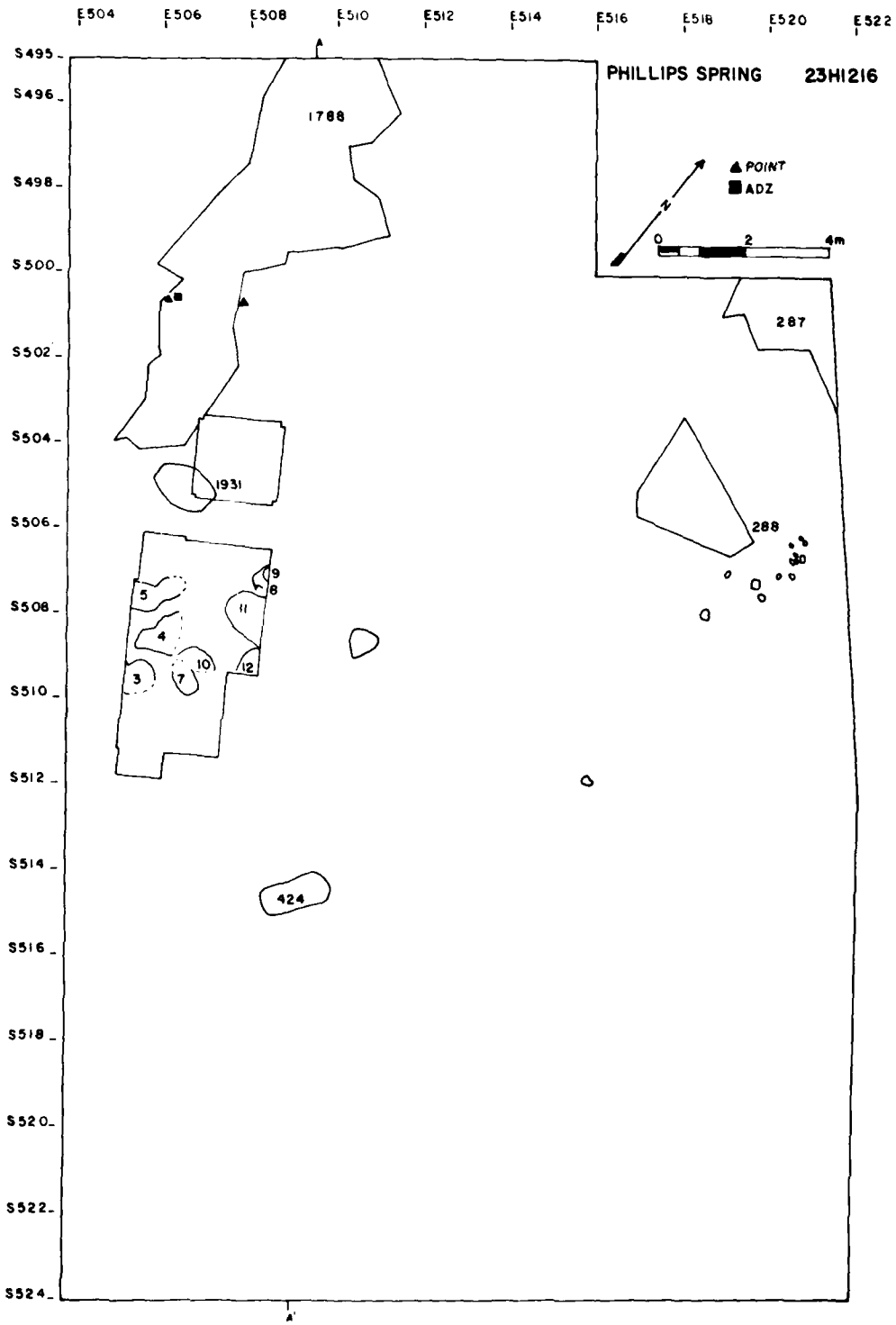

Figure 20. Features, unit E Sedalia phase component 4.

reasonable on stratigraphic grounds for Feature 1788. Refer to Robinson (1978) for descriptions of prospective component 4 Features 287, 288 and 424, and to Chomko (1976) for Features 3 through 12.

Feature 1788 is an extensive lithic scatter with maximum dimensions of 10.20 m length, 5.20 m width, having a general north-south orientation, irregular shape and surface area of 22.02 m^2. Thickness varies from about 4 cm to 15 cm. The entire feature was excavated and although the 1974 excavation is nearby it does not appear to overlap. The basal surface inclines to the north where it occurs at D.D. 2.50 m; to the south it drops to an average depth of D.D. 2.70 m. The feature fill is mainly a dark grayish brown (10YR4/2 wet) clayey silt with some mottling, charcoal and bone debris that is largely indistinguishable from underlying component 3 features. A gradual sharp transition marked by decreases in rock and differences in their strikes and dips delineate the two. A preliminary listing of Feature 1788 artifacts is in Table 6.

TABLE 6

Feature 1788 Artifacts*

POINTS	ADZ	BIFACE	CORE	HEMATITE
1726	1725	1755	1762	1863
1749		1755	1766	1864
1786		1757	1767	
		1760		
		1761		
		1815		
		1816		
		1817		
		1846		
		1847		
		1859		
		1860		
		1861		
		1862		
		1865		

*Preliminary; catalog numbers listed.

Another prospective feature is Feature 1931, a pit excavated just south of Feature 1788. Dimensions are 1.34 m (east-west) long, 1.05 m (north-south) wide, with a depth of between 17 cm and 19 cm, starting about 2.80 m below datum and ending at D.D. 2.99 m. The walls are straight to slightly incurvate at the base. Pit fill reflects compound deposition. The first 9 cm are a very dark gray (10YR3/1 wet) clayey silt with chert flakes and dolomite. Charcoal is within the last 2 cm and extends into a lower 1 cm of sand laminated or mottled sediments. From 10 cm to 15 cm there is an increase in unmodified

pieces of rock and a color change to a dark gray (10YR4/1 wet) or very dark grayish brown (10YR3/2) clayey silt. Artifacts found in the basal sediments (D.D. 2.90 m to 2.99 m) include four bifacially flaked and one unifacially flaked implements (respective catalog numbers 1989, 1996, 1998, 2002, 2004). The stratigraphic relationship between Features 1931 and 1858 indicate that Feature 1931 is probably from component 4, and is a northern most pit of the series excavated in 1974.

UNIT E SEDALIA COMPONENT 5

This component is defined by a single rock scatter of unknown overall proportions, Feature 1858. Most of this feature's known area had been excavated in 1974, in two squares on either side of the remaining portion (Figure 21), and it apparently extended to the west of the 1974 test squares at a depth below datum of about 2.70 m. There is no overlap with component 4 Feature 1788 that ends at this depth about 1.10 m to the north. Possibly correlated deposits at about this or perhaps slightly deeper depth were excavated to the east in 1977. A single date on charcoal collected from the northern 1974 2 m square is 3050±60 (SMU-235) radiocarbon years B.P. Chomko (1976) describes this as "Stratum D", and the 1974 field notes label the rock scatter as a "Feature 2," a designation later dropped. Chomko's (1976) description indicates a unit of about 30 cm thickness of gray (10YR5/1) clay, though this is based on observations of an excavation profile southwest of the spring. He further diagrams "Stratum D" as being directly above his Feature 2 from which he obtained squash seeds (Chomko 1976:18). But this is in disagreement with a diagram on the preceding page (Chomko 1976:17) of his report that shows his Feature 2 as being below a "Stratum E?." Nor is this discrepancy clarified.

Even so, what makes the correlation between the 1974 Stratum D rock scatter and Feature 1858 reasonable are two things. First and foremost is that the two 1974 excavations clearly truncated the feature. Second, the 1974 field notes and photographs of the rock scatter closely resemble the geometry and content of Feature 1858.

Excavation of Feature 1858, in 1978, was within an oblong area, 1.32 m long, 88 cm wide, in 2 m grid squares 504SE504 and 504SE506. The feature was recognized at a depth below datum of 2.66 m as a tightly packed lithic scatter in form and content similar to Feature 1124 (component 3). Most of the rock mat ended between 2.70 m and 2.75 m below datum; maximum thickness is about 10 cm. The fill is a very dark gray (10YR3/1 wet) clayey silt with fist size, angular sandstone and chert cobbles, ground or chipped stone artifacts, calcined bone. Artifacts recovered include hematite, three bifaces including a drill base and a ground stone item (respective catalog numbers 1856, 1853, 1854, 1857, 1855). Beneath Feature 1858, was an oval pit, Feature 1931, that appears to be from component 4.

UNIT E MIDDLE WOODLAND OR UNKNOWN COMPONENT

A series of pit features was defined or excavated at the south end of the excavation block in 1977 (see Robinson 1978 for discussions of

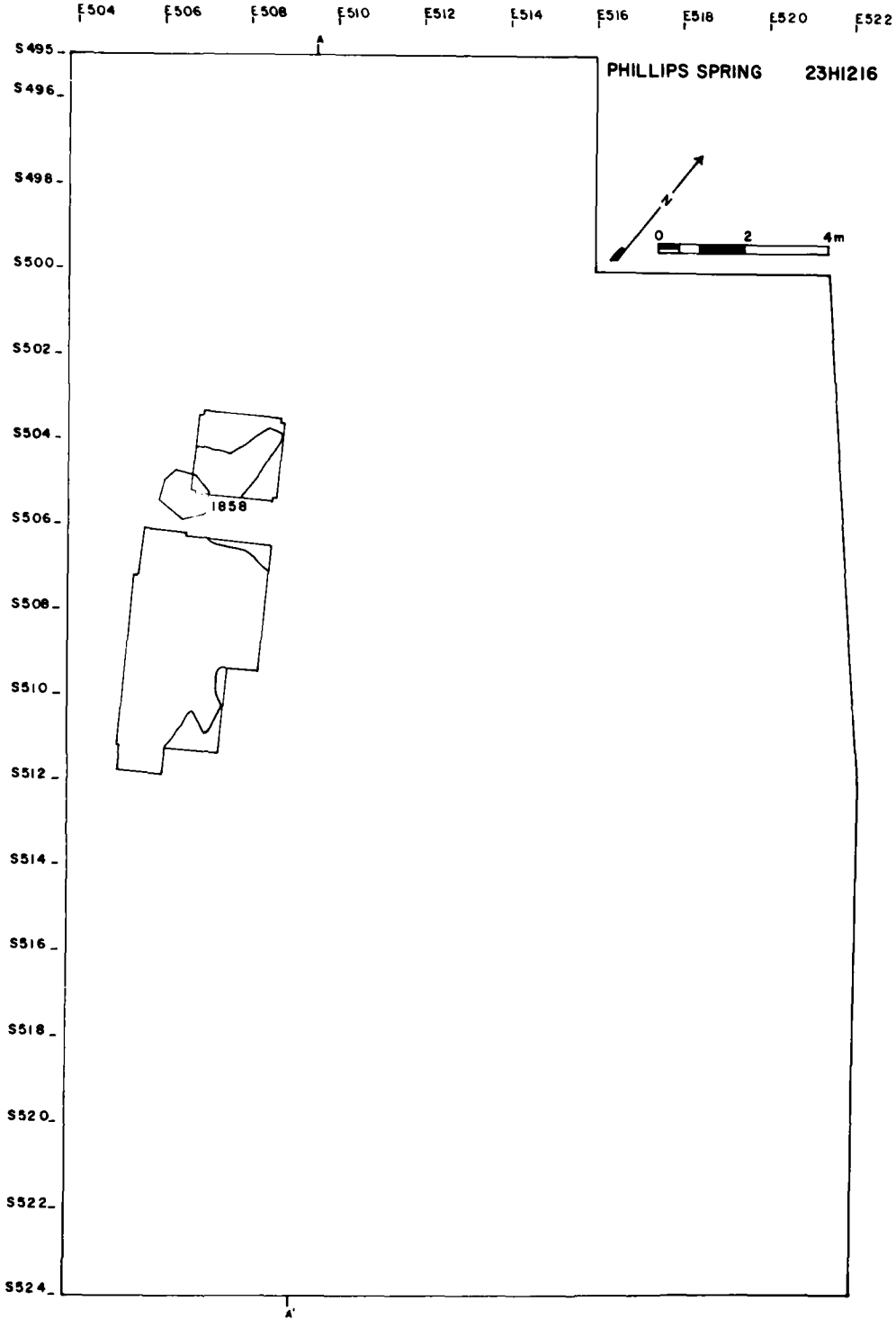

Figure 21. Feature, unit E Sedalia phase component 5.

Features 378 through 423, 927 and 935). Radiocarbon dating of these, Features 415, 392, and 408 (Tables 1, 2), demonstrates an age range between 2245±103 and 1897±84 B.P. This allows the assignment of most if not all of these features to the Middle Woodland period. In 1978, in extending the excavation to the west, four other features were also delineated that are placed provisionally with these Middle Woodland or probable Middle Woodland remains. Their description follows.

A single excavated pit, Feature 3011, is either from an unassigned Sedalia phase or Middle Woodland context. This and other unexcavated features from the southwest corner of the 1978 block are shown in Figures 22, 23. Feature 3011 had perhaps the best surface definition of any pit from Phillips Spring (Figure 22). At the surface (D.D. 2.55 m) the pit fill is a dark gray (10YR4/1 wet) to very dark gray (10YR3/1 wet, at D.D. 2.60 m) silt with white sand lenses, charred and uncharred wood in sharp contrast with the surrounding gray (10YR5/1 wet) mottled to brownish yellow (10YR6/6 wet) clayey matrix. The fill maintains a consistent color and texture throughout; sand lensing also occurs. No tools were found though chert flakes occurred between D.D. 2.60 m and 2.70 m. The pit had gently sloping walls and an overall basin shape ending at 2.77 m below datum. The pit is an oval 1.10 m long, 1.03 m wide, 23 cm in depth in 2 m grid squares 520SE506 and 522SE506.

About 2 m west of Feature 3011, extending into the west profile are two or three feature areas not excavated due to lack of time. The south area, Feature 3489, is a rectangular dark gray stain with a minimum width of 90 cm and a mapped length of 1.7 m. An oval light gray stain, probably a pit, Feature 3490, is to the north and may truncate part of Feature 3489. Feature 3490 is about 90 cm in diameter. A third oval stain is to the east of Feature 3490, is about 80 cm in diameter, and is designated as possible pit Feature 3491.

Three other pits that probably originate in unit E and truncate unit K were sectioned by Trench 7. These are numbered in Figure 7 Features 3492-3494.

STYLISTIC INDICES

Three artifact classes, points, adzes, and pendants, are valuable for stylistic comparisons. Pottery, generally of major interest also, was not found in 1978. Chomko (1976, 1978) describes ceramics from the 1974 excavations. I rely on photographs to illustrate differences in artifact form. Provenience data for sorted specimens are tabulated for intrasite comparison (Table 7). Techno-functional and stylistic categories are those described in the Rodgers Shelter Project report (Kay 1978). Refer to that report also for a preliminary statement of intersite comparisons.

CHIPPED STONE

Stylistically sensitive chipped stone artifacts are divided into five formal (enumerated) point categories, or types, and a distinctive

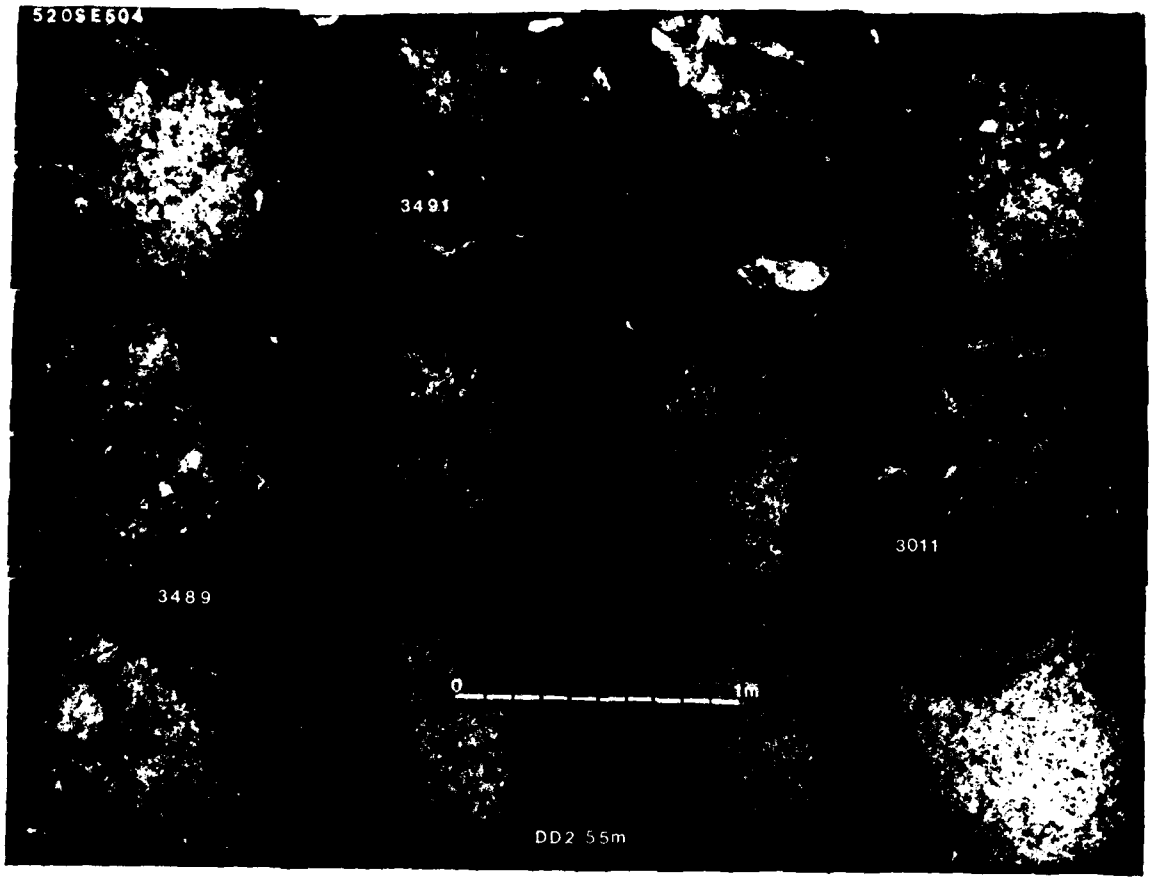

Figure 22. Photomosaic of 3 m by 4 m rectangle 520SE504 showing floor prior to excavation of Feature 3011.

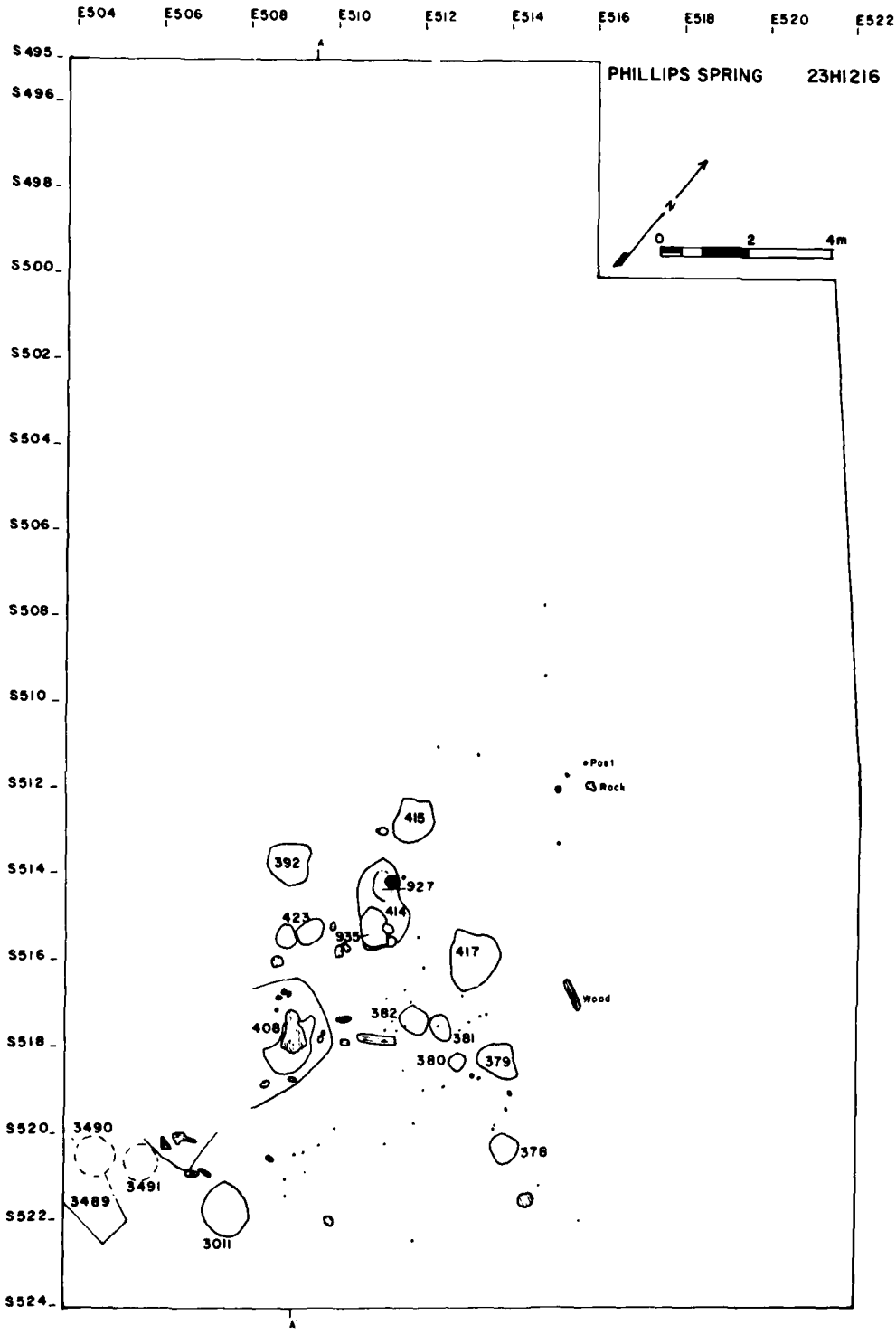

Figure 23. Unit E Middle Woodland or unknown component features. Features 378, 379, 381, 386, 3489-3491 unexcavated.

TABLE 7

Provenience Data for Selected Artifact Classes

TYPE(#)	CAT. #	UNIT	COMPONENT	COORDINATES	D.D.	FIG.	REMARKS
8	1751	E/G	M.W.?	524.6SE506.7	2.05	24a	south profile
9	1722	E	S.P.6?	495.7SE504.5	1.94	24b	
9	1749	E	S.P.4	503.7SE504.4	2.76		heat frac., F1788
9	1924	E	S.P.1	510.3SE506.5	3.10	24c	impact fracture
9	1972	E	S.P.1	511.9SE506.3	3.28		transverse frac.
9	1973	K/E		517.9SE506.1	2.88		impact fracture
9	2009	E	S.P.3	516.3SE504.3	2.96		F1969
9	2022	E	S.P.1	510.0SE507.6	----		F1173 disturbed
9	3040	E	S.P.1	514.4SE506.3	3.00	24d	
9	3046	E	S.P.1	504.7SE509.8	3.18		F201
9	3052	E	S.P.1	512.0SE506.0	3.06		
9	3059	E	S.P.2	503.5SE509.9	2.99	24e	F3351
9	3349	E	S.P.1	506.3SE509.4	3.14		F201
9	3488	E	S.P.1	505.9SE501.2	3.05	24f	
14	1728	E	S.P.5	506.0SE504.0	2.63	24g	impact fracture
14	1739	E	S.P.3	498.5SE509.0	2.80		impact frac., F1126
14	1786	E	S.P.4	500.8SE507.7	2.70		impact frac., F1788
14	1921	E	S.P.3	499.3SE509.1	2.73		impact frac., F1126
14	1971	E	S.P.2?	517.1SE507.9	2.89		heat fracture
14	1984	E	S.P.3	501.4SE507.4	2.79		impact fracture
14	2014	E	S.P.3	500.5SE507.4	2.77		impact fracture
14	2041	E	S.P.1	512.0SE506.1	3.05*	24h	
14	2058	E	S.P.2?	516.2SE508.5	2.85	24i	heat fracture
17	1922	E	S.P.3	499.6SE509.1	2.78	24j	F1126
17	2019	E	S.P.1?	517.4SE507.9	3.07		preform
17	2049	E	S.P.1?	512.5SE507.7	3.12		heat fracture
17	3259	E	S.P.1	506.6SE511.6	3.06	24k	F3272
17	3355	E	S.P.2	503.9SE512.0	2.97	24l	impact frac., F3351
50	1726	E	S.P.4	500.7SE506.1	2.58		impact frac., F1788
50	1777	K	S-G 2	511.2SE508.6	3.60	24m	impact fracture
50	1923	E	S.P.3	498.9SE508.8	2.73		impact frac., F1126
50	2060	E	S.P.1	508.9SE506.2	3.13		impact fracture
50	3244	E	S.P.1	506.4SE509.9	3.10	24n	transv. frac., F201
50	3357	E	S.P.1	507.2SE509.4	3.21	24o	F201
50	3408	E	S.P.1	505.3SE510.2	3.33		F201
50	3409	E	S.P.1	503.2SE511.5	3.05		transv. frac., F201
50	3427	E	S.P.3?	512.0SE503.2	2.85		above F3428
UNC.PT.	3041	E		514.0SE504.0	3.07+	24p	dart
UNC.PT.	3129	E	S.P.1	512.4SE506.8	3.28	24q	stemmed, F1173
S.ADZ	1725	E	S.P.4	500.7SE506.1	2.65	25a	F1788
S.ADZ	1781	E		514.0SE504.0	2.80		disturbed
S.ADZ	1941	K/E?		516.4SE507.3	3.14		
S.ADZ	2018	E	S.P.3?	515.9SE507.9	2.95		distal, F1969
S.ADZ	2040	E	S.P.1?	513.0SE507.9	2.99		proximal
S.ADZ	3123	E	S.P.1	512.8SE507.4	3.18		proximal, F1173
S.ADZ	3258	E	S.P.1	509.0SE510.9	3.10		distal, F3272
S.ADZ	3260	E	S.P.1	505.0SE512.9	3.05		proximal, F3272
S.ADZ	3268	E	S.P.1	506.2SE510.5	3.20	25b	F201
S.ADZ	3350	E	S.P.1	506.6SE509.9	3.21	25c	F201
S.ADZ	3356	E	S.P.2	503.9SE511.5	3.15	25d	F3351
S.ADZ	3366	E	S.P.1	506.5SE510.0	3.25*		F201
S.ADZ	3368	E	S.P.1	506.7SE509.8	3.24		F201 proximal°
S.ADZ	3369	E	S.P.1	506.9SE509.7	3.23		F201 distal°
S.ADZ	3439	E	S.P.1	503.5SE510.6	3.17	25e	F201
S.ADZ	3453	E	S.P.1	504.0SE510.5	3.49		proximal, F201
PENDANT	3261	E	S.P.1	506.3SE510.1	3.11	25f	F201
PENDANT	3359	E	S.P.1	505.8SE510.3	3.19	25g	F201, blank

* 15 cm from 50 cm^2 grid unit

\+ 17.5 cm from 2 m^2 grid unit

° mended adz preform broken in manufacture

implement, the Sedalia adz that Chapman (1975:184) referred to as a "digger." Two unclassified points are discussed also as they illustrate some of the ambiguity in a typological approach to artifact classification. All implements discussed here show wear or other obvious features of hafting. Haft element morphology, overall size are defining criteria for point types. Shape, haft preparation through lateral grinding, bit morphology, wear and resharpening but not consistent size distinguish the Sedalia adz from similar Late Archaic implements such as the Clear Fork gouge (Ray 1941). Somewhat surprisingly, the Sedalia adz has an overall morphology, haft preparation and wear similar to the much earlier Dalton adz (Morse and Goodyear 1973; Goodyear 1974:39-42). Both points and adzes show the abuse of day-to-day use as utilitarian implements. In Binford's (1962) terminology, they are technomic artifacts.

Specimens listed (Table 7) are all from the 1978 excavation, mainly *in situ* finds. Other classifiable specimens without doubt have yet to be sorted.

Category 8: Langtry

Figure 24a is the single specimen of this distinctive contracting stem, concave base point type. The specimen, of oolitic Jefferson City chert, has an old blade fracture and one shoulder is also missing; the blade was damaged again in excavation. Thickness is 7 mm; no other dimensions are measurable.

Category 9: Smith

These large basally notched points (Figure 24b-f) are represented by thirteen specimens. Two are either heat treated Burlington (1749) or Chouteau (1973) chert; the others are either oolitic or banded Jefferson City chert. Of the latter, at least one (1972) is heat treated. Length of complete specimens ranges from 65 mm to 79 mm; broken specimen 1924 has a measurable length of 97 mm. Width varies from 40 mm to 53 mm; thickness, 10 mm to 12 mm. Blade fractures are either due to impact, probably due to impact, or unsuccessful heat treatment.

Category 14:

These well made corner notched darts (Figure 24g-i) are represented by nine excavation specimens and a tenth from disturbed deposit. All appear to be heat treated, and are finely pressure flaked. Two are either Burlington (3058) or Chouteau (1787) chert; the remainder are either oolitic or banded Jefferson City chert. Only two (1932, 2041) are complete enough for length measurement that ranges from 30 mm to 63 mm. Width varies from 17 mm to 26 mm; thickness, from 4 mm to 8 mm. Six broken specimens have impact fractures.

Category 17: Sedalia

These large, straight to concave base lanceolates (Figure 24j-l)

Figure 24. Chipped stone points, 1978 excavation (a, Langtry; b-f, Smith; g-i, Type 14 dart; j-l, Sedalia lanceolate; m-o, Etley; p, q, unclassified). Scale in cm.

are represented by five specimens. All are either oolitic or banded Jefferson City chert; three (1922, 2049, 3259) are heat treated; the other two may be also. One (2019) is a preform broken in blade thinning. Of the complete or nearly complete specimens there is some variation in blade outline. One (3259) appears not to have been used or to have been extensively reworked after heating. The distal end of specimen 1922 shows extreme wear and resharpening. The third (3355) is nearly parallel sided and has a long impact facet on one face. Length of two complete specimens varies between 83 mm and 97 mm; impact fractured specimen 3355 is 98 mm in measured length. Width varies from 33 mm to 38 mm; thickness, from 8 mm to 11 mm.

Category 50: Etley

These medium to large corner notched points (Figure 24m-o) are represented by eleven specimens, two (1925, 1987) from disturbed deposits. Typically the base is concave; shoulders, barbed. A shouldered midsection (1502, unit K^2) is in all likelihood a broken Etley, as a second Etley (1777) was also found in unit K^2, the Squash and Gourd Zone. Only specimen 3408 is Burlington Chert. All others are either oolitic or banded Jefferson City chert. Of these, five (1777, 1923, 1925, 2060, 3357) are heat treated. Dimensions for measurable specimens are: length, 55 mm to 94 mm; width, 33 mm to 36 mm; thickness, 6 mm to 12 mm. Blade fractures include either impact, or possibly impact-derived fractures.

Unclassified Points:

Figure 24p is a small side notched ovate dart. Dimensions are: length, 37 mm; width, 19 mm; thickness, 5.5 mm. The point appears to have been formerly the blade element of a broken corner notched specimen, basally thinned and notched.

Figure 24o is an asymmetrical, stemmed specimen with a transverse blade fracture. The original preform appears to have been ovate in shape, and to have been basally notched. One side was then reworked, creating an asymmetrical blade but, still, an entirely functional cutting tool; fracture occurred subsequently. Width is 33 mm; thickness, 10 mm. Possibly, the specimen was initially a Smith point (category 9).

Sedalia Adzes:

Sedalia adzes (Figure 25a-e) are roughly rectangular with rounded bit and rounded to pointed base. Cross sections are steeply lenticular. The body is bifacially flaked and laterally ground. Haft and wear polish is evident on most of the fifteen specimens, all of which are either oolitic or banded Jefferson City chert. Wear polish on one or both bit surfaces and the range in adz sizes suggest repeated use, resharpening and final rejection, once a minimum size resulted. Dimensions range from 85 mm to 124 mm in length, 33 mm to 44 mm in width, and 13 mm to 24 mm in thickness.

Figure 25. Diagnostic chipped or ground stone artifacts, 1978 excavation (a-e, Sedalia adzes; f, pendant; g, pendant blank). Scale in cm.

GROUND STONE

Two ground stone objects, one a drilled pendant (Figure 25f), the other, an almost identical pendant blank (Figure 25g), came from Sedalia phase component 1 Feature 201. To my knowledge these are unique items, but other excavations on Sedalia sites should produce other examples.

The pendant is of limestone or dolomite, is tear drop in outline, ground on all surfaces, and drilled from opposing faces. Dimensions are 48 mm long, 30.5 mm wide, 9 mm thick. The perforation is about 8 mm in greatest diameter, going to 4.5 mm in the center.

The pendant blank is of similar material and ground on all surfaces. A natural concavity in one face has been enlarged, apparently in preparation for subsequent drilling. Dimensions are 42 mm long, 28 mm wide, and 8.5 mm thick.

Neither artifact is incised or otherwise decorated; both are crude.

INTRASITE COMPARISON OF CHIPPED STONE

Table 8 summarizes the distribution of stylistically sensitive chipped stone from the 1977, 1978 excavations.

TABLE 8

Intrasite Distribution 1977, 1978 Excavations

POINT CATE-GORIES	S-G	SP 1	SP 2	SP 3	SP 4	SP 5	SP 6?	M.W.	TOTAL
7								1	1
8								3	3
9		8	1	6	1		3		19
13							1		1
14		1	2	4	1	1			9
15				1					1
17		4	1	2					7
42								1	1
48								1	1
49				2					2
50	1	5		6	1				13
Sub Total	1	18	4	21	3	1	4	6	58
SEDALIA ADZ		14	1	1	1				17
Total	1	32	5	22	4	1	4	6	75
% Pts	1.33	24.00	5.33	28.00	4.00	1.33	5.33	8.00	77.32
% Adz	0.00	18.66	1.33	1.33	1.33	0.00	0.00	0.00	22.65

DISCUSSION

Unfortunately, it is too early to do more than present a descriptive statement of Phillips Spring excavations and archaeology. But it is my opinion that this information is of value to the understanding of this site, and needs to be disseminated in a timely fashion.

The discovery in 1978 of five, or possibly six, Sedalia phase components in unit E and at least one Etley point in unit K^2, the Squash and Gourd Zone, are especially welcome additions to our knowledge. It is clear that the distribution, size and content of features from these components vary, a good example being the differences in total points and adzes from Sedalia components 1 and 3 (Table 8). There can be little question that these differences reflect contrasts in site use through time and within a single cultural tradition. On typological, stratigraphic and radiometric grounds, a later Middle Woodland tradition is defined also. Plant cultivation occurred in both traditions, representing a significant adaptive shift in the economies of western Ozark Highland communities after about 4300 radiocarbon years B.P. Perhaps this transition occurred a thousand to two thousand years, or more, earlier, but the Phillips data are hardly conclusive.

Recommendations follow for other studies of excavation collections.

RECOMMENDATIONS

Problem areas where further analysis of Phillips Spring have, in our opinion, the greatest probability of adding significantly to the knowledge of prehistory and paleoenvironments are outlined below.

Changes in Site Function, Seasonality and Community Layout:

Rapid burial by Pomme de Terre overbank alluvium effectively sealed individual Phillips occupational floors shortly after use. These floors are stratified and most are dated by C^{14}. With the exception of intersecting storage pits dug near the present spring conduit, there is little if any mixing of deposits; and the affects of mixing of storage pit contents have been controlled for both in their excavation and subsequent C^{14} dating of uncarbonized floral contents.

Facilitating these studies are recovery and recording techniques, which have almost entirely entailed excavation in arbitrary units of 10 cm thickness or, whenever an occupational surface or pit feature was defined, natural stratigraphic units of less than 10 cm thickness. Major architectural features and domestic scatters were photographed in 1 m square tiles, plane table mapped and removed in 50 cm square grid units; all matrix was subjected to water flotation with the exception of small soil samples. Water used for flotation or screening of sediments was diverted from the artesian spring discharge and was free of modern botanical contamination. Whenever practical, *in situ* items were point plotted. The excavation grid system was further designed for compatibility with a computerized mapping program, SYMAP (Dougenik and Sheehan 1975), well suited to the analytical requirements of this research.

The intent of these studies would be to compare and contrast reconstructed tool kits, qualitative and quantitative differences in debris, architectural features and/or domestic scatters for discrete, dated occupational surfaces or their subcomponents; and to assess both duration and time of settlement. On an intrasite level, these studies would be directed to delineating potential variation in the layouts of features, technological items and refuse requisite to modeling site function, its change through time and seasonal differences in occupation or scheduling of extractive and maintenance tasks. Examination of potential sexual and/or individual differences in tasks performance would be prime analytic goals. On an intersite level, these studies would be directed to comparison of site usages, particularly as these pertain to the physical settings, geomorphology and proximity to biotic and abiotic resources.

The Subsistence Base During the Transition to Small Scale Gardening:

Dated botanical and faunal remains from Phillips living floors and various architectural features including numerous storage pits present unusual opportunities to examine in detail the subsistence base of this site's inhabitants.

The best data are botanical and include uncarbonized remains of wild and cultivated species. Excavation controls have been sufficient to segregate economically important or exploited plants from the natural "seed rain" at the site. The approach of these analyses would entail identification of plant foods, their most probable season(s) of use either as fresh or stored food, quantity and nutritional values; as well as computation of similarity matricies for living floors or storage pit ethnobotanical contents. Goals of these studies would be to assess the relative values of various wild and cultivated plants to the overall diet, to monitor changes in plant consumption either through time or seasonally, and--at the local level--to evaluate edaphic or topographic relationships of wild and domesticated plants.

Soil chemistry and food preparation techniques have limited discarded faunal remains to either larger elements or pieces of animal bone, scraps of calcined bone and severely eroded or degraded mussel shell. For the most part, the mussel shell could not be recovered satisfactorily and it was conspicuous in but a single large feature. Vertebrate debris is insufficient for analysis of butchering techniques but it may prove of value in fleshing out the exploitation of certain medium and large mammals (raccoon and deer) as well as fish and herpetiles. Wherever practical, attempts would be made to assess the minimum group sizes that could be supported by both faunal and floral resources from Phillips Spring.

Taxonomy of Early Cucurbits:

The large quantities coupled with superior quality of Phillips Spring squash and gourd seeds as well as rinds of at least gourd present a rare opportunity to examine the morphology of taxonomically important plant parts; peduncles and squash rinds may also be present

but, if so, remain unsorted from the 1978 matrix samples. Taxonomic studies would be directed to assessing the sizes and shapes of Phillips cucurbits; when they were most likely to have been harvested; whether or not seeds represent fortuitous matrix inclusions or were perhaps the remains of caches left at the end of a fall harvest.

Holocene Environments:

Holocene environment of the lower Pomme de Terre is a subject of long standing interest, great but largely unrealized expectations. It is doubtful that Phillips more than other investigated sites will contribute all data needed for environmental reconstruction; but it is equally clear that Phillips alone has at least a partial Holocene pollen record as well as plant macrofossil, gastropod and sediment data that complement those of Rodgers Shelter and other Pomme de Terre artesian spring sites. The purpose of these studies would be to organize all of this information into a cohesive statement of environmental change, to whatever degree is feasible to modify or further amplify the models of Holocene environments that have come about through study of Rodgers Shelter. Although primary reliance should be placed in completing the pollen studies, the focus of these efforts would also entail further examination of clinal variation in both gastropod and vertebrate faunas, mechanical and pedogenic studies of sediments, physical description of the spring anatomy and relationship to the Rodgers terrace, and limnological reconstruction based on bryophytes.

CONCLUDING SUMMARY

Phillips Spring is a site well worth remembering. The few who worked there dealt with something nearly unique in American archaeology --a site with not only some of the oldest evidence of plant cultivation in eastern North America but also, surprisingly, some of the best preserved plant remains found in the East. Considering the eventual prominence crop growing had in the prehistory of this area, it is not difficult to appreciate the excitement caused by word of these discoveries at Phillips Spring and a few other sites in Kentucky and eastern Tennessee.

The Phillips Spring cultigens consist of two species of cucurbits, squash (*Cucurbita pepo*) and bottle gourd (*Lagenaria siceraria*). There is still some question as to where the bottle gourd was first domesticated but squash domestication occurred in Mexico several thousand years before it first appeared at Phillips Spring around 4250 radiocarbon years ago (B.P.). This time marks the beginning of a more than 2200 year chronicle of plant use and gardening at Phillips Spring and in the western Ozark Highland, significantly of exotic, tropical plants that preceded the domestication of native species in the Eastern Woodlands. Some of the implications of this information for understanding prehistoric change in eastern North America are outlined next.

On a regional scale, one can infer from these facts that: (i) development of more dependable forms of food production came before the

first major cultural climax, Hopewell, and probably was a factor that allowed stable, year-round settlement of many areas of the Eastern Woodlands; (ii) the distribution of cucurbits was widespread by no later than 4000 B.P.; (iii) a primitive form, or forms, of exchange (economic activity, possibly involving trade) has as yet defined connections with northern Mexico by no later than 4000 B.P.

Phillips Spring is a cornerstone in the on-going study of the prehistory of the Ozark Highland, especially of the Late Archaic (5000-2500 B.P.) and Woodland (2500-1000 B.P.) periods. It is one of two of the most extensively excavated and radiocarbon dated habitation sites in the lower Pomme de Terre River valley, the other is Rodgers Shelter. Together, these two sites form a base line for systematic comparisons with other sites, though it is clear that important differences exist in their layout and use. At Rodgers Shelter the overhang itself presents a natural focus for activity and at least minimal protection from the elements. This may partially explain the absence of prepared subterranean food storage chambers that are common at Phillips Spring. The configurations of food storage chambers and habitation, or living, floors for the many physically separate and stratified Phillips Spring components suggest no similar predisposition in the placement of architectural features. Even the excavation of storage pits near the artesian conduit appears to have had as many negative as positive effects. On the one hand, their excavation may have been easier because the sediments near the spring were probably moist and soft. On the other hand, the pits were more susceptible to periodic inundation during times of high artesian discharge. A second area of contrast is that Rodgers Shetler appears to have been a Late Archaic and Woodland specialized hunting and gathering encampment occupied during the fall and winter, whereas Phillips Spring, in general, probably had year round use as a base camp and crop growing was an essential economic activity.

Commanding the most attention are the Late Archaic components at Phillips Spring. These Sedalia phase units begin in stratigraphic unit K^2 (Squash and Gourd Zone) and are succeeded by no less than five Sedalia components in unit E. Although variation exists in the total areas excavated from each of these Sedalia phase components, data are sufficient for recognition of changes through time in kinds of architectural features and tools found at Phillips Spring. Eventually it should be possible to describe in detail the changes in site function that are currently under speculation. Differences in site use seem to be indicated by variation in the size, type and contents of architectural features. As one example, the linear hearth basins at the base of unit E are unique in the archaeology of both Phillips Spring and the Pomme de Terre River valley. Later habitation involved small hearth areas and the use of more hunting or butchering tools at the expense of wood working implements. Food storage in prepared pits does not appear to readily correlate with the extensive rock mats, or domestic areas, many of which contain a few stone grinding slabs or mealing implements.

Woodland features consist of storage pits, wood posts or post molds, and are associated with radiocarbon dates for mainly the Wood-

land period from 2300-1800 B.P. The posts or post molds demonstrate no obvious patterning but concentrate near or around the storage pits. However, the possibility of there having been one or more structures should not be overlooked, as some of the post and pit features are dug into one another. The C^{14} dates also indicate a relatively long if sporadic period of use. There are no large scale rock mat features identified with the Middle Woodland occupations, in physical contrast with the Late Archaic.

There is no evidence to suggest population aggregates larger than small band-size or family groups during the Late Archaic and Woodland periods, either for Phillips Spring or the valley as a whole. During the Middle Woodland period, this area especially may have been of marginal importance to regional developments, as the main population aggregates were concentrated in sedentary villages on first order rivers such as the lower Missouri, or Illinois. The same cannot be said, however, for the Late Archaic. During this time, Phillips Spring was in the forefront of changes in subsistence economy that 3000 years later led to the pre-eminence of agriculture in the East.

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APPENDIX 1. 1978 Excavation Personnel, Phillips Spring.

PRINCIPAL INVESTIGATOR: Marvin Kay

SENIOR SITE ASSISTANT: Christine K. Robinson

EXCAVATION ASSISTANT: Bruce F. Benz

PROCESSING SUPERVISOR: Richard D. Hake

PHOTOGRAPHERS: John Nylander, Thomas Koenig

LABORERS:	DURATION
Michael A. Behm	5 June - 21 June
Paul J. Brankin	19 June - 16 July
Tamara L. Bray	7 July - 8 July
Bernard P. Brown	19 June - 24 August
Kathleen Duncan	11 August - 22 August
Geoffrey D. Evans	5 June - 4 August
Marc Evans	13 June - 16 July
John Hobbs	16 June - 21 July
Donnie Hughes	24 July - 1 August
John F. Kelley	7 July - 8 July
Grover C. Roberts III	18 July - 22 August
Paul M. Stevens	5 June - 4 August
Lyle Sweeney	24 July - 23 August
VOLUNTEERS:	
Richard Miller	25 June - 2 July
Amy Trester	6 July - 13 July

APPENDIX 2. Phillips Spring Publications and Reports.

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Geochronology of Phillips Spring.

Kay, M.
The research program.
Phillips Spring: Intersite Correlations.
Project evaluation and summary.
Truman Reservoir mitigation and the Rodgers Shelter Project.

King, F. B.
Preliminary analysis of botanical remains from Phillips Spring.

King, J. E.
Palynological investigations at Phillips Spring.

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The Phillips Spring excavation.
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APPENDIX 3. Scope of Work.
NPKED-PR

1 May 1978

MITIGATION OF THE ADVERSE EFFECT OF
HARRY S. TRUMAN DAM AND RESERVOIR PROJECT, MISSOURI,
ON PHILLIPS SPRING ARCHEOLOGICAL SITE, ASSOCIATED WITH RODGERS SHELTER

SCOPE OF WORK

MODIFICATION TO CONTRACT DACW41-76-C-0011

1. INTRODUCTION.

a. The Government is currently engaged in the construction of the Harry S. Truman Dam and Reservoir project on the Osage River, Missouri. The dam will create a reservoir of approximately 55,600 acres. It is proposed that approximately 166,000 acres be purchased in fee.

b. One of the effects of this project is inundation of Phillips Spring, an archeological site located in the Pomme de Terre arm of the reservoir. The Phillips site is closely associated with Rodgers Shelter, which is listed on the National Register of Historic Places. The site is also part of the Harry S. Truman Dam and Reservoir Archeological District, which is eligible for inclusion in the National Register of Historic Places.

c. A proposed mitigation plan for cultural resources at Harry S. Truman project includes an agreement for further data recovery excavation at Phillips Spring. This work is in addition to that previously described in Contract DACW41-76-C-0011, including modifications 1 and 2.

d. The work defined herein to be performed by the Contractor will be in accordance with the action called for in the proposed mitigation plan. This work will comply with Executive Order 11593, "Protection and Enhancement of the Cultural Environment," dated 13 May 1971. Funding for this work is authorized under Public Law 86-523 as amended by Public Law 93.291.

2. SCOPE

a. This work encompasses archeological excavation of Phillips Spring's lower cultural levels, which were not emphasized in the 1977 excavations, to expand the data base on these lower levels. The work also encompasses cataloguing, processing, and limited analysis of recovered materials.

b. The Contractor shall prepare a report of findings. The cultural materials recovered shall be prepared for curation, and curated by the Contractor. Requirements for the excavation, analysis, curation and

report are described in detail below. The Contractor shall conduct this work in a professional manner, using accepted methodology, in accordance with 36 CFR 66.

3. DESCRIPTION OF WORK

a. Mitigation.

(1) The mitigation of adverse impacts on an archeological site can be accomplished by scientific investigation directed toward recovery of data and cultural material. Proper curation of the recovered materials, and documentation of data is vital. The mitigation action includes limited analysis of materials recovered to the extent that the report will be of value to archeologists in future research on the materials. Mitigation does not include funding of such future research, but does require making these materials available for research.

(2) As stated in the Phillips Spring proposal of 1976 by Illinois State Museum,

> "Mitigation, for archeological sites where excavation is agreed to be the most feasible alternative, mandates the archeologist to design a research program which will extract the maximum amount of information possible within the constraints of time and resources. Thus, it is the conservation of information, that is, the publication of results and the systematic filing of data (records and materials) in perpetuity, that preserve a site's integrity for the posterity of this Nation."

(3) In the case of limited funds for investigation of such an extensive and deep site which will be destroyed, information retrieval can be maximized by setting the highest priority (time and money expenditure) on actual excavation of the site, with properly stringent controls and methods. As stated in the quote above, a research strategy is necessary to structure excavation and thus to maximize information recovery.

(4) The collections and other excavation data must be examined, defined, and the results published in a form that provides access to the data. Proper curation is also necessary for future research access, as stated in the 1976 proposal by Illinois State Museum:

> "All materials removed from an archeological site and the accompanying records which are systematically stored and curated as research collections represent the original resource in a secondary context. These materials, which have been properly excavated, filed, and curated, become an invaluable resource for study to future generations."

b. Study Orientation.

(1) The data collected will be usable in three levels of study:

(a) The overall data collection shall be as broad as possible, directed toward all current archeological topics. Collecting data for a variety of potential research activities is a usual goal of archeological excavations.

(b) Data collection at Phillips Spring shall also be directed toward topics which are being and have been emphasized in archeological work at Truman project. These topics have been described as:

> " ... the changing human ecology of the western Ozark Highland ... the broad problem areas of settlement - subsistence studies, seasonality, resource extraction and redistribution, population dynamics, and Holocene environmental change."

The investigation of the lower levels at Phillips Spring will contribute to the knowledge of continuity and change in the successive communities represented at the site.

(c) In particular, Phillips Spring has been identified as remarkable because of its preservation environment. The water-saturated sediments contain occupation floors, architectural features and technological, ethnobotanical and vertebrate remains as well as Holocene pollen. The pollen record provides data to refine the paleoenvironmental models, in assocation with the cultural material. This record also allows further testing of models of cultural adaptation developed at Rodgers Shelter. Botanical evidence at Phillips Spring includes some of the earliest remains of cultigens north of Mexico. The evidence is important in studying the introduction of cultigens into the Mississippi Valley area, and refining hypotheses for native plant domestication. Data collection at Phillips Spring shall focus on recovery of pollen and ethnobotanical material.

c. Methodology.

To collect data directed toward the study problems presented, the Contractor shall use accepted and appropriate excavation and analysis methods as set forth in 36 CFR 66.

(1) Excavation shall emphasize recovery of materials from the lower cultural levels. First priority shall be to establish stratigraphy and relationships of the lower levels by collecting data from all these lower levels.

Second priority is to collect additional data to determine intra-site patterns in whichever of these levels are determined to be most significant by the Contractor. Excavation shall include:

(a) Dewater spring.

(b) Use mechanical equipment with care to remove overburden above these levels, and for trenching to examine profiles.

(c) Standard recovery methods including flotation and water-screening. Although the material recovered will be eventually amenable to detailed analysis such as extensive measurements and use in the SYMAP program, these analyses shall not be done under the present contract. Pollen samples and other appropriate botanical material shall be obtained and stabilized for storage but shall not be processed under this contract.

(d) Use standard provenience and mapping techniques.

(e) Collect materials for absolute dating when appropriate.

(f) Photograph phases of field work, including black and white photos and illustrate diagnostic features and artifacts by either black and white photography or line drawings.

(g) Perform all measurements using the metric system.

(h) All excavation activities shall be coordinated with the National Park Service inundation study.

(i) After the excavations are completed the Contractor shall document in writing, the conditions of the site in accordance with 36 CFR63.

(2) Analysis

(a) Because of limited funds, emphasis of this contract work is on excavation recovery. Since recovered materials will be permanently curated and available for future detailed analysis, the analysis covered by this contract is limited. Functional analyses such as wear studies shall not be done. Comparative stylistic study of artifacts shall be limited. Limited geomorphological and geochronological studies, primarily dating of sediments, shall be done.

(b) Clean and catalog all storable recovered materials.

(c) Make a preliminary analysis of cultural materials to provide a base for future use by the archeological profession as data for research.

(d) Ancillary studies shall include processing of carbon-14 samples.

(e) Priority shall be given to analysis of nonstorable materials.

d. Storage of Materials. Attached to the letter of transmittal for the final report shall be a listing of all cultural materials found during the field investigations, and a Certificate of Authenticity for these materials. Collections shall be properly stored in containers clearly marked "Property of the U.S. Government, Kansas City District, Corps of Engineers." These materials shall be stored at a qualified Missouri repository, if possible, or at a repository mutually agreed upon by the Government, the Contractor, and the State Historic Preservation Officer. Retrieval of these materials by the U.S. Army Corps of engineers for use by the Government is reserved. If the materials are to be removed from the curatorial facilities, this action must be approved in writing by the Contracting Officer.

4. SCHEDULE OF WORK AND REPORT

a. Coordination and Meetings. The Contractor shall pursue the study in a professional manner in accordance with 36 CFR 66, to meet the schedule specified. Prior to the initiation of actual field work, the Contractor shall coordinate all field schedules and activities with the appropriate project cultural resources coordinator and the SHPO. During the course of the study, the Contractor shall submit a monthly progress report. In addition, the Contractor shall review the progress of the work performed with the Corps of Engineers, and the State Historic Preservation Officer (SHPO) at meetings as follows:

(1) Coordination meetings with the Government to include at least one during the field season at field headquarters, and one during the laboratory and analysis period at the Contractor's facilities.

(2) One meeting, early in the report writing phase, at the Contractor's office with representatives of the SHPO, the Contractor, and the Government to discuss report content and format.

(3) One meeting at the Contractor's office to discuss the review of the draft copy of the report.

b. Report Content and Schedule

(1) A report of findings shall be prepared by the Contractor and his staff. The report is intended to be of use and interest to the general public as well as of value to the profession; therefore, the main text of the report shall be written in a manner suitable for reading by persons not professionally trained as archeologists. Use of illustrations is encouraged. The report shall be descriptive of the excavations and the materials recovered, including results of the limited analysis. The report shall describe the methods used. Recommendations for future analysis,

not to be funded by the Government as part of mitigation, shall be included in the report.

(2) The report shall be authored by either the principal investigator or the project director. If the project director is not the author, he shall review and edit the report prior to submission of the draft and final versions.

(3) Thirteen (13) copies of a complete draft of the report shall be submitted to the Contracting Officer for purposes of Governmental review within 15 months of Notice to Proceed. (If excessive inclement weather or other delays occur, this date may be extended to one mutually agreed upon between the Government and the Contractor.) In addition, the Government may, at its discretion, send the draft report and Scope of Work to qualified professionals not associated with a State or Federal governmental agency for peer review of the merits and acceptability of the report. The Contractor shall submit a list of persons qualified to perform this review. After a review period of approximately two (2) months, the Government will return the draft to the Contractor, the Contractor shall complete necessary revisions and submit the final report within 60 days after receipt of the reviewed draft. The Contractor shall submit one set of originals and two copies of the final report of findings. The copies shall include all plates, maps, and graphics in place so that they may be used as patterns for assembling the final report. The Government will edit the final report and after approval will reproduce this report and provide the Contractor ten (10) copies for personal use, plus two (2) copies for each major contributing author.

(4) The report shall not be repetitious with previous reports prepared for this contract but shall include the following:

(a) Minimal description of the study area.

(b) A discussion of the site investigations and the analysis mentioned above. A description of the recovered cultural material and site layout shall be presented both in support of the discussion in the text and also as data for professional use of the report.

(c) A detailed description of the methods used in field and lab work.

(d) Detailed recommendations for future analysis.

(e) Illustrations, photos, maps, tables and graphic representation of data appropriate to the text, such as illustrations of diagnostic artifacts and drawings showing the extent and location of excavation and density of material.

(f) A discussion of each cultural component in the site.

(g) A glossary of terms, if appropriate.

(h) Reference section with all sources referred to in text or used for report, personal communications, interviews, bibliography, etc.

(i) Copies of all correspondence pertaining to the review of the draft report. These are to include the comments of the State Historic Preservation Officer (SHPO); Heritage Conservation and Recreation Service, Office of Archeology and Historic Preservation (HCRS-OAHP); any reviews by professional archeologists furnished by the Government, together with responses to each of the comments given. The Scope of Work shall be included in this section.

(j) Listing of principal investigators and their qualifications, and a list of field and lab personnel, as an appendix.

(5) Final originals shall be typed single-spaced on one side of paper with the margins set for reproduction on both sides of 8 x 10-1/2-inch paper. Margins on the side of the page to be bound (left side for printing on front of page, right side for printing on back of page) shall be at least 1-1/4 inches. Opposite margins (on free edges of pages) shall be at least 3/4-inch wide. All pages shall be numbered. All text and illustrations shall be of reproducible quality. The report shall be accompanied by a completed National Technical Information Service form which will be supplied by the Government.

c. Other Information. Four copies of materials not suitable for publication in the report shall be submitted with the draft. These materials shall include listings of data records on file at the Illinois State Museum resulting from this contract, so that requests for information can be referred to the Museum. Copies of these materials will be on file with HCRS, SHPO, and the Corps of Engineers.

d. Nomination forms to the National Register of Historic Places shall be completed by the Contractor and furnished to the Government for review and processing.

5. FURTHER RESPONSIBILITIES OF THE CONTRACTOR AND GOVERNMENT

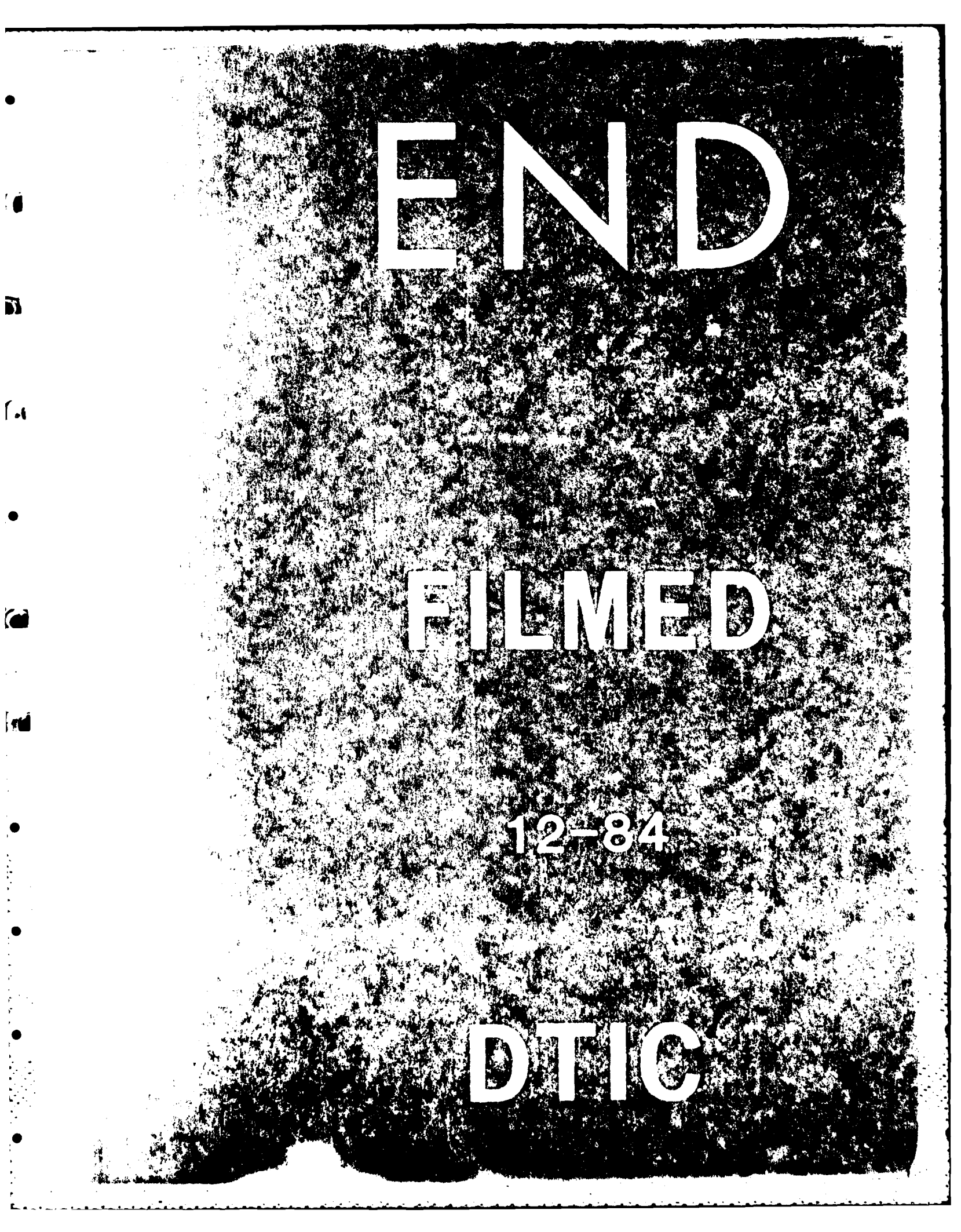
a. Data Availability. The Government will provide the Contractor with available background information, maps, remotely sensed data reports, and correspondence as needed, including (1) a copy of the Memorandum of Agreement for Harry S. Truman project when it becomes available, and (2) review comments. In addition, the Government will provide support to the Contractor regarding suggestions on data sources, format of study outline and report, and review of study progress.

b. Right-Of-Entry and Crop Damages. The Contractor shall have right-of-entry to all property owned by the Government pertinent to this contract. Compensation for damages to crops planted on Government property leased to various individuals shall be the responsibility of the Contractor.

c. Publication. It is expected that the Contractor and those in his employ, may during the term of the contract, present reports of the work to various professional societies and publications. Outlines of those reports dealing with the work sponsored by the Corps of Engineers shall be sent to the Kansas City District Office for review and approval, in writing, prior to presentation or publication. Proper credit shall be given for the Corps of Engineers-sponsored work, and the Corps of Engineers shall be furnished six (6) copies of each such paper and/or published report.

d. Court Testimony. In the event of controversy or court challenge, the Contractor shall make appropriate expert witnesses available and shall be placed under contract to testify on behalf of the Government.

e. Safety Requirements. The Contractor shall provide a safe working environment for all persons in his employ as prescribed by EM 385-1-1, "General Safety Requirements," a copy of which will be provided by the Government.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